Water Resources Survey

Part I:

HISTORY OF LAND AND WATER USE ON IRRIGATED AREAS

and

Part II:

MAPS SHOWING IRRIGATED AREAS IN COLORS DESIGNATING THE SOURCES OF SUPPLY

Blaine County, Montana

Published by
STATE WATER CONSERVATION BOARD
Helena, Montana — June, 1967
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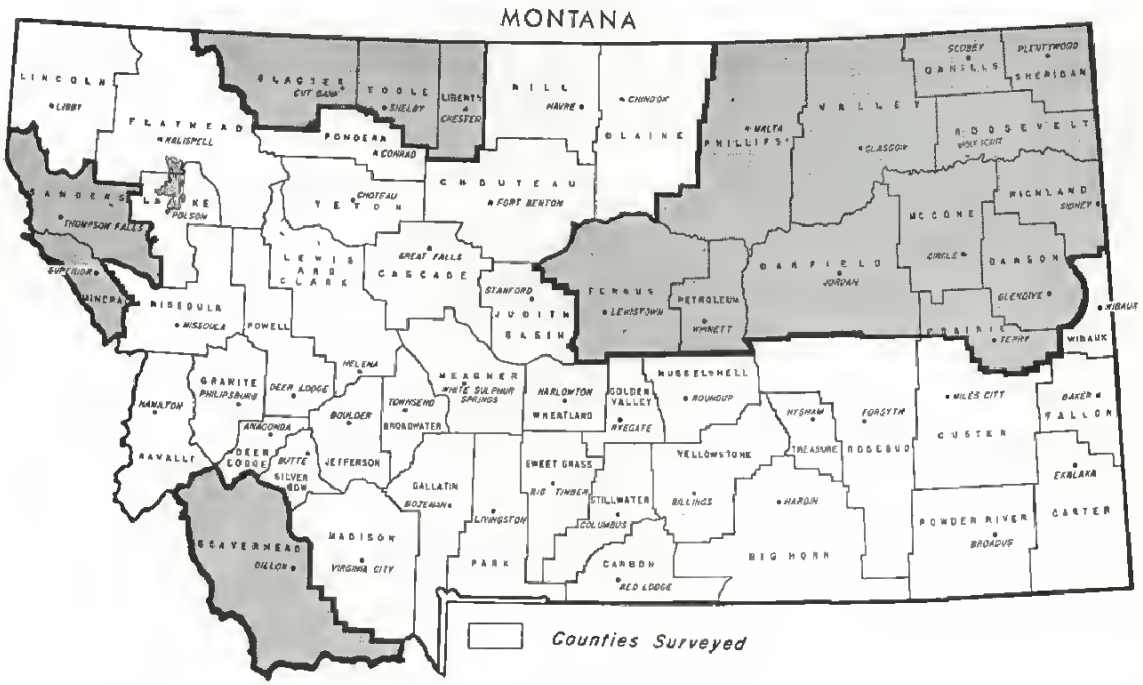
WATER RESOURCES SURVEY

BLAINE COUNTY
MONTANA

Part I
History of Land and Water Use
on Irrigated Areas



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STATE WATER CONSERVATION BOARD
Helena, Montana

June, 1967

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MONTANA STATE AGRICULTURAL EXPERIMENT STATION

C. C. Bowman, Irrigation Engineer and Consultant, Bozeman

June, 1967

Honorable Tim M. Babcock
Governor of Montana
Capitol Building
Helena, Montana

Dear Governor Babcock:

Submitted herewith is a consolidated report on a survey of Water Resources for Blaine County, Montana.

The report is divided into two parts: Part I consists of history of land and water use, irrigated lands, water rights, etc., and Part II contains the township maps in the County showing in colors the lands irrigated from each source or canal system.

Work has been completed and reports are now available for the following counties: Big Horn, **Blaine,** Broadwater, Carbon, Carter, Cascade, Chouteau, Custer, Deer Lodge, Fallon, Flathead, Gallatin, Golden Valley, Granite, **Hill,** Jefferson, Judith Basin, Lake, Lewis and Clark, Lincoln, Madison, Meagher, Missoula, Musselshell, Park, Pondera, Powder River, Powell, Ravalli, Rosebud, Silver Bow, Stillwater, Sweet Grass, Teton, Treasure, Wibaux, Wheatland, and Yellowstone.

The office files contain minute descriptions and details of each individual water right and land use, which are too voluminous to be included herein. These office files are available for inspection to those who are interested.

The historical data on water rights contained in these reports can never become obsolete. If new information is added from time to time as new developments occur, the records can always be kept current and up-to-date.

Respectfully submitted,
A. D. McDERMOTT, Director
State Water Conservation Board

ACKNOWLEDGMENTS

A survey and study of water resources involves many phases of both field and office work in order to gather the necessary data to make the information complete and comprehensive. Appreciation of the splendid cooperation of various agencies and individuals who gave their time and assistance in aiding us in gathering the data for the preparation of this report is hereby acknowledged.

BLAINE COUNTY OFFICIALS

John H. Stephens, Commissioner

Edwin Sparks, Commissioner — Clarence Ritter, Commissioner

Mrs. Cora L. Musgrove, Clerk and Recorder

Mrs. Monica D. Miller, Clerk of District Court — Harold C. West, Assessor

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Mrs. Monica D. Miller.....Secretary, Fort Belknap Irrigation District

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Walter E. Hanson.....Secretary, Paradise Valley Irrigation District

Thomas E. Delvin.....Secretary, Harlem Irrigation District

Don Snedecor.....Secretary, North Chinook Irrigation Association

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BLAINE COUNTY

FOREWORD

SURFACE WATER

Our concern over surface water rights in Montana is nearly a century old. When the first Territorial Legislature, meeting in Bannack, adopted the common law of England on January 11, 1865, the Territory's legal profession assumed that it had adopted the Doctrine of Riparian Rights. This doctrine had evolved in England and in the eastern United States where the annual rainfall is generally more than twenty inches. It gave the owners of land bordering a stream the right to have that stream flow past their land undiminished in quantity and unaltered in quality and to use it for household and livestock purposes. The law restricted the use of water to riparian owners and forbade them to reduce appreciably the stream flow, but the early miners and ranchers in Montana favored the Doctrine of Prior Appropriation which permitted diversion and diminution of the streams. Consequently, the next day the legislature enacted another law which permitted diversion by both riparian and non-riparian owners. Whether or not this action provided Montana with one or two definitions of water rights was not settled until 1921 when the Montana Supreme Court in the Mettler vs. Ames Realty case declared the Doctrine of Prior Appropriation to be the valid Montana water right law. "Our conclusion," it said, "is that the common law doctrine of riparian rights has never prevailed in Montana since the enactment of the Bannack Statutes in 1865 and that it is unsuited to the conditions here . . ."

The appropriation right which originated in California was used by the forty-niners to divert water from the streams to placer mine gold. They applied to the water the same rules that they applied to their mining claims—first in time, first in right and limitation of the right by beneficial use. Those who came to Montana gulches brought with them these rules, applying them to agriculture as well as to mining.

The main points of consideration under the Doctrine of Prior Appropriation are:

1. The use of water may be acquired by both riparian and non-riparian landowners.

2. It allows diversion of water regardless of the reduction of the water supply in the stream.

3. The value of the right is determined by the priority of the appropriation; i.e., first in time is first in right.

4. The right is limited to the use of the water. Stream waters in Montana are the property of the State and the appropriator acquires only a right to their use. Moreover, this use must be beneficial.

5. A right to the use of water is considered property only in the sense that it can be bought or sold; its owner may not be deprived of it except by due process of law.

The State Legislature has provided methods for the acquisition, determination of priority and administration of the right. No right may be acquired on a stream without diversion of water and its application to a beneficial use. On unadjudicated streams, the Statutes stipulate that the diversion must be preceded by posting a notice at a point of intended diversion and by filing a copy of

it within 20 days in the county clerk's office of the county in which the appropriation is being made. Construction of the means of diversion must begin within 40 days of the posting and continue with reasonable diligence to completion. However, the Montana Supreme Court has ruled that an appropriator who fails to comply with the Statutes may still acquire a right merely by digging a ditch and putting the water to beneficial use.

To obtain a water right on an adjudicated stream one must petition the District Court having jurisdiction over the stream for permission to make an appropriation. If the other appropriators do not object, the court gives its consent and issues a supplementary decree granting the right subject to the rights of the prior appropriators.

Montana laws do not require water users to file official records of the completion of their appropriations; therefore, it becomes advisable as soon as the demand for the waters of a stream becomes greater than its supply, to determine the rights and priorities of each user by means of an adjudication or water right suit. This action may be initiated by one or more of the appropriators who may make all the other claimants parties to the suit. The Judge of the District Court then examines all of the claims and issues a decree establishing priority of the right of each water user of the amount of water he is entitled to use. The court decree becomes in effect the deed of the appropriator to his water right.

Whenever scarcity of water in an adjudicated stream requires an allocation of the supply according to the priority of rights, the Judge, upon petition of the owners of at least 15 percent of the water rights affected, must appoint a water commissioner to distribute the water. Chapter No. 231, Montana Session Laws 1963, Senate Bill 55 amended Section 89-1001 R.C.M. 1947, to provide that a water commissioner be appointed to distribute decreed water rights by application of fifteen percent (15%) of the owners of the water rights affected, or, under certain circumstances at the discretion of the Judge of the District Court—"*provided that when petitioners make proper showing they are not able to obtain the application of the owners of at least fifteen percent (15%) of the water rights affected, and they are unable to obtain the water to which they are entitled, the Judge of the District Court having jurisdiction may, in his discretion, appoint a water commissioner.*" After the Commissioner has been appointed the Judge gives his instructions on how the water is to be apportioned and distributed in accordance with the full terms of the decree.

The recording of appropriations in local courthouses provides an incomplete record of the water rights on unadjudicated streams. In fact, the county records often bear little relation to the existing situation. Since the law places no restriction on the number or extent of the filings which may be made on an unadjudicated stream, the total amount of water claimed is frequently many times the available flow. There are numerous examples of streams becoming over appropriated. Once, six appropriators each claimed all the water in Lyman Creek near Bozeman. Before the adjudication of claims to the waters of Prickly Pear Creek, 68 parties claimed thirty times its average flow of about 50 cfs. Today, the Big Hole River with an average flow of about 1,000 cfs. has filings totaling 173,912 cfs. One is unable to distinguish in the county courthouses the perfected rights from the unperfected ones since the law requires no official recording of the completion of an appropriation. Recognition by the courts of unrecorded appropriations adds to the incompleteness of these records. To further complicate the situation, appropriators have used different names for the same stream in their filings. In Montana, many of the streams flow through several counties; consequently, water right filings on these inter-county streams are found distributed in two or more county courthouses. Anyone desirous of determining appropriations on a certain river or creek finds it difficult and expensive to

examine records in several places. In addition, the records are sometimes scattered because the original nine counties of 1865 have now increased to 56. As the original counties have been divided and subdivided, the water right filings have frequently not been transcribed from the records of one county to the other. Thus, a record of an early appropriation in what is at present Powell County may be found in the courthouse of the original Deer Lodge County.

It can readily be seen that this system of recording offers little protection to rights in the use of water until they are determined by adjudication. In other words, an appropriator does not gain clear title to his water right until after adjudication, and then the title may not be clear because the Montana system of determining rights is also faulty. In the first place, adjudications are costly, sometimes extremely costly when they are prolonged for years. It is estimated that litigation over the Beaverhead River, which has lasted more than twenty years, has cost the residents of the valley nearly one-half million dollars. In the second place, unless the court seeks the advice of a competent irrigation engineer, the adjudication may be based upon inaccurate evidence; in the third place, if some claimant has been inadvertently left out of the action, the decree is not final and may be reopened for consideration by the aggrieved party. Another difficulty arises in determining the ownership of a water right when land under an adjudicated stream becomes subdivided in later years and the water is not apportioned to the land by deed or otherwise. There is no provision made by law requiring the recording of specific water right ownership on deeds and abstracts.

The Legislative Session of 1957 passed Chapter 114 providing for the policing of water released from storage to be transmitted through a natural stream bed to the place of use. The owner of the storage must petition the court for the right to have the water policed from the storage reservoir to his place of use. If there are no objections, the court may issue the right and appoint a water commissioner to distribute the water in accordance therewith. This law applies only to unadjudicated streams.

Administration of water on adjudicated streams is done by the District Court, but it has its drawbacks. The appointment of a water commissioner is often delayed until the shortage of water is acute and the court frequently finds it difficult to obtain a competent appointee for so temporary a position. The present administration of adjudicated streams which cross the county boundaries of judicial districts creates problems. Many of the water decrees stipulate head gates and measuring devices for proper water distribution, but in many instances the stipulation is not enforced, causing disagreement among water users.

Since a water right is considered property and may be bought and sold, the nature of water requires certain limitations in its use. One of the major difficulties encountered after an adjudication of a stream is the failure of the District Court to have control over the transfer of water rights from their designated places of use. The sale and leasing of water is becoming a common practice on many adjudicated streams and has created serious complications. By changing the water use to a different location, many of the remaining rights along the stream are disrupted, resulting in a complete breakdown of the purpose intended by the adjudication. Legal action necessary to correct this situation must be initiated by the injured parties as it is their responsibility and and not that of the court.

At one time or another all of the Western Reclamation States have used similar methods of local regulation of water rights. Now all of them, except Montana, have more or less abandoned these

practices and replaced them by a system of centralized state control such as the one adopted by the State of Wyoming. The key characteristics of the Wyoming system are the registration of both the initiation and completion of an appropriation in the State Engineer's Office, the determination of rights and administration by a State Board of Control headed by the State Engineer. These methods give the Wyoming water users title to the use of water as definite and defensible as those which they have to their land.

When Montana began to negotiate the Yellowstone River Compact with Wyoming and North Dakota in 1939, the need for some definite information concerning our water and its use became apparent. The Legislature in 1939 passed a bill (Ch. 185) authorizing the collection of data pertaining to our uses of water and it is under this authority that the Water Resources Survey is being carried on. The purpose of this survey is six fold: (1) to catalogue by counties in the office of the State Engineer, all recorded, appropriated, and decreed water rights including the use rights as they are found; (2) to map the lands upon which the water is being used; (3) to provide the public with pertinent water right information on any stream, thereby assisting in any transaction involving water; (4) to help State and Federal agencies in pertinent matters; (5) to eliminate unnecessary court action in water right disputes; and (6) to have a complete inventory of our perfected water rights in case of need to defend these rights against the encroachments of lower states, or Wyoming or Canada.

GROUND WATER

Ground water and surface water are often intimately related. In fact, it is difficult in some cases to consider one without the other. In times of heavy precipitation and surface runoff, water seeps below the land surface to recharge underground reservoirs which, in turn, discharge ground water to streams and maintains their flow during dry periods. The amount of water stored underground is far greater than the amount of surface water in Montana, and, without seepage from underground sources, it is probable that nearly all the streams in the state would cease to flow during dry periods.

It is believed that Montana's ground water resources are vast and only partly developed. Yet, this resource is now undergoing accelerated development as the need for its use increases and economical energy for pumping becomes available. Continued rapid development without some regulation of its use would cause a depletion of ground water in areas where the recharge is less than the withdrawal. Experience in other states has shown that once excessive use of ground water in a specific area has started, it is nearly impossible to stop, and may result in painful economic readjustments for the inhabitants of the affected area.

Practical steps aimed at conserving ground water resources as well as correcting related deficiencies in surface water laws became necessary in Montana. Prior to the Legislative Session of 1961, there was no legal method of appropriating ground water. Proposed ground water codes were introduced and rejected in four biennial sessions of the Montana Legislative Assembly—1951, 1953, 1955, and 1959.

In 1961, during the 37th Legislative Session, a bill was introduced and passed creating a Ground Water Code in Montana (Chapter 237, Revised Codes of Montana, 1961). This bill became effective as a law on January 1, 1962, with the State Engineer of Montana designated as "Administrator" to

carry out provisions of the Act. However, the 1965 Legislature abolished the office of the State Engineer and transferred his duties to the State Water Conservation Board, effective July 1, 1965. Therefore, the State Water Conservation Board became the "Administrator" of this Act.

Some of the important provisions contained in Montana's Ground Water Law are:

Section 1. DEFINITIONS OR REGULATIONS AS USED IN THE ACT.

(a) "Ground Water" means any fresh water under the surface of the land including the water under the bed of any stream, lake, reservoir, or other body of surface water. Fresh water shall be deemed to be the water fit for domestic, livestock, or agricultural use. The Administrator, after a notice of hearing, is authorized to fix definite standards for determining fresh water in any controlled ground water area or sub-area of the State.

(b) "Aquifer" means any underground geological structure or formation which is capable of yielding water or is capable of recharge.

(c) "Well" means any artificial opening or excavation in the ground, however made, by which ground water can be obtained or through which it flows under natural pressures or is artificially withdrawn.

(d) "Beneficial use" means any economically or socially justifiable withdrawal or utilizations of water.

(e) "Person" means any natural person, association, partnership, corporation, municipality, irrigation district, the State of Montana, or any political sub-division or agency thereof, and the United States or any agency thereof.

(f) "Administrator" means the Water Conservation Board of the State of Montana.

(g) "Ground Water Area" means an area which, as nearly as known facts permit, may be designated so as to enclose a single distinct body of ground water, which shall be described horizontally by surface description in all cases and which may be limited vertically by describing known geological formations, should conditions dictate this to be desirable. For purpose of administration, large ground water areas may be divided into convenient administrative units known as "sub-areas."

Section 2. RIGHT TO USE.

Rights to surface water where the date of appropriation precedes January 1, 1962, shall take priority over all prior or subsequent ground water rights. The application of ground water to a beneficial use prior to January 1, 1962, is hereby recognized as a water right. Beneficial use shall be the extent and limit of the appropriative right. As to appropriations of ground water completed on and after January 1, 1962, any and all rights must be based upon the filing provisions hereinafter set forth, and as between all appropriators of surface or ground water on and after January 1, 1962, the first in time is first in right.

Any ground water put to beneficial use after January 1, 1962 must be filed with the County Clerk and Recorder in the county where the ground water is withdrawn in order to establish a right to use of the water.

Montana's Ground Water Code now provides for three different types of forms available for filing water rights depending upon the nature of the ground water development. The old Form No. 4 became invalid after January 1, 1966.

Form No. 1 **"Notice of Appropriation of Ground Water"**—shall require answers to such questions as (1) the name and address of the appropriator; (2) the beneficial use for which the appropriation is made, including a description of the lands to be benefited if for irrigation; (3) the rate of use in gallons per minute of ground water claimed; (4) the annual period (inclusive dates) of intended use; (5) the probable or intended date of first beneficial use; (6) the probable or intended date of commencement and completion of the well or wells; (7) the location, type, size, and depth of the well or wells contemplated; (8) the probable or estimated depth of the water table or artesian aquifer; (9) the name, address, and license number of the driller engaged; and (10) such other similar information as may be useful in carrying out the policy of this Act. This form is optional, but it has an advantage in that after filing the Notice of Appropriation, a person has 90 days in which to commence actual excavation and diligently prosecute construction of the well. Otherwise, failure to file the Notice of Appropriation deprives the appropriator of his right to relate the date of the appropriation back upon filing the Notice of Completion. (Form No. 2)

Form No. 2 **"Notice of Completion of Ground Water by Means of Well"**—this form shall require answers to the same sort of questions as required by Form No. 1 (Notice of Appropriation of Ground Water), except that for the most part it shall inquire into accomplished facts concerning the well or means of withdrawal, including (a) information as to the static level of water in the casing or the shut-in pressure if the well flows naturally; (b) the capacity of the well in gallons per minute by pumping or natural flow; (c) the approximate drawdown or pumping level of the well; (d) the approximate surface elevation at the well head; (e) the casing record of the well; (f) the drilling log showing the character and thickness of all formations penetrated; (g) the depth to which the well is drilled; and similar information.

It shall be the responsibility of the driller of each well to fill out the Form No. 2, "Notice of Completion of Ground Water by Means of a Well," for the appropriator, and the latter shall be responsible for its filing.

Form No. 3 **"Notice of Completion of Ground Water Appropriation Without a Well"**—is for the benefit of persons obtaining (or desiring to obtain) ground water without a well, such as by sub-irrigation or other natural processes so as to enable such persons to describe the means of using ground water; to estimate the amount of water so used; and requiring such other information pertinent to this particular type of ground water use.

Montana's Ground Water Code, as amended by the 1965 Legislature, provides for a period of four (4) years after January 1, 1962 for filing on vested ground water rights (all ground water used prior to January 1, 1962 from water wells, developed springs, drain ditches, sub-irrigation, etc.). Therefore, the deadline was December 31, 1965. A person did not lose his vested ground water rights by failure to file within the four-year period although, in the event of a future ground water dispute, he may be called upon to prove his rights in court. If a person files now on ground water developed prior to January 1, 1962, his date of priority becomes the date of filing, rather than the date when the water was first used.

It shall be recognized that all persons who have filed a Water Well Log Form as provided for under Section 1 and 2 of Chapter 58, Session Laws of Montana, 1957, shall be considered as having complied with the requirements of this Act.

It is important to note that the ground water law states, "UNTIL A NOTICE OF COMPLETION (form #2 or #3) IS FILED WITH RESPECT TO **ANY** USE OF GROUND WATER INSTITUTED **AFTER** JANUARY 1, 1962, **NO** RIGHT TO THAT USE OF WATER SHALL BE RECOGNIZED."

Copies of the forms used in filing on ground water are available in the County Clerk and Recorder's office in each of Montana's 56 counties. It shall be the duty of the County Clerk in every instance to file the original copy for the county records; transmit the second copy to the Administrator (Water Conservation Board); and the third copy to the Montana Bureau of Mines and Geology; and the fourth copy to be retained by the appropriator (person making the filing).

Accurate records and amount of water available for future use are essential in the administration and investigation of water resources. In areas where the water supply becomes critical, the ground water law provides that the administrator may define the boundaries of the aquifer and employ inspectors to enforce rules and regulations regarding withdrawals for the purpose of safeguarding the water supply and the appropriators (see the wording of the law for establishing a "controlled area").

The filing of water right records in a central office under control of a responsible State agency, provides the only efficient means for the orderly development and preservation of our water supplies and it protects all of Montana's use—on both ground and surface water.

METHOD OF SURVEY

Water resources data contained in Part I and Part II of this report are obtained from courthouse records in conjunction with individual contacts with landowners. A survey of this type involves extensive detailed work in both the office and field to compile a comprehensive inventory of water rights as they apply to land and other uses.

The material of foremost importance used in conducting the survey is taken from the files of the county courthouse and the data required includes: landownership, water right records (decrees and appropriations), articles of incorporation of ditch companies and any other legal papers concerning the distribution and use of water. Deed records of landownership are reviewed and abstracts are checked for water right information when available.

Aerial photography is used by the survey to assure accuracy in mapping the land areas of water use and all the other detailed information which appears on the final colored township maps in Part II. Section and township locations are determined by the photogrammetric system, based on government land office survey plats, plane-table surveys, county maps and by "on-the-spot" location during the field survey. Noted on the photographs are the locations of each irrigation system, with the irrigated and irrigable land areas defined. All the information compiled on the aerial photo is transferred and drawn onto a final base map by means of aerial projection. From the base map, color separation maps are made and may incude three to ten overlay separation plates, depending on the number of irrigation systems within the township.

Field forms are prepared for each landowner showing the name of the owner and operator, photo index number, a plat defining the ownership boundary, type of irrigation system, source of water supply and the total acreage irrigated and irrigable under each. All of the appropriated and decreed water rights that apply to each ownership are listed on the field forms with the description of intended place of use. During the field survey, all water rights listed on the field form are verified with the landowner. Whenever any doubt or complication exists in the use of a water right, deed records of the land are checked to determine the absolute right and use.

So far as known, this is the first survey of its kind ever attempted in the United States. The value of the work has become well substantiated in the counties completed to date by giving Montana its first accurate and verified information concerning its water rights and their use. New development of land for irrigation purposes by State and Federal agencies is not within the scope of this report. The facts presented are found at the time of completion of each survey and provide the items and figures from which a detailed analysis of water and land use can be made.

The historical data contained in these reports can never become obsolete. If new information is added from time to time as new developments occur, the records can always be kept current and up-to-date.

Complete data obtained from this survey cannot be included in this report as it would make the text too voluminous. However, if one should desire detailed information about any particular water right, lands irrigated, or the number and amount of water rights diverting from any particular stream, such information may be obtained by writing the State Water Conservation Board in Helena.

Every effort is being made to ensure accuracy of the data collected rather than to speed up the work which might invite errors.

WATER RESOURCES SURVEY

Blaine County, Montana

PART I

History of Land and Water Use
On Irrigated Areas

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HISTORY AND ORGANIZATION

The first inhabitants in the area of Montana which is now Blaine County were the Gros Ventres and the Assiniboine Indian tribes. Both of these tribes are descendants of other groups of Indian people—the Gros Ventres from Algonquin stock and the Assiniboine from Sioux stock.

Since their first contacts with the white man, the Gros Ventres have lived near their present home in Montana on the Fort Belknap Indian Reservation in Blaine and Phillips Counties. The name Gros Ventres was given to the Atsina Indians by French traders and means "big bellies." The Assiniboine, in 1862, roamed over the region between the Saskatchewan and Assiniboine Rivers, which included the areas of the Bearpaws and Little Rocky Mountains of Northern Montana.

By a treaty established in 1855 the Assiniboine tribe used a common hunting ground with the Blackfeet, Gros Ventres, and the Crow Indian tribes. Boundaries of the hunting ground extended north from the Yellowstone River to the Canadian border and east from the Rocky Mountains to the junction of the Yellowstone and Missouri Rivers. The Assiniboine were constantly at war with the Dakota Sioux and since the Sioux was the more powerful tribe, the Assiniboine were kept on the move from place to place in search of food.

The Fort Belknap Indian Reservation, as originally established on July 3, 1873, included a large area in Northern Montana. Amendments to the Indian Reservation Act in 1874, 1875, 1880, and 1888 reduced the size of the reservation and opened large areas of it to homestead settlement. Changes in the Act, however, set aside certain lands for the separate Blackfeet, Fort Peck, and Fort Belknap Indian Reservations.

One of the oldest trading posts in the Blaine County region was Fort Browning located at the mouth of Peoples Creek in 1868. This fort was abandoned in 1872 because of the war-minded Sioux tribes who made frequent forays into the country to hunt buffalo thus making it impossible for the Gros Ventres to trade peaceably at the fort. A new fort was built one and one-half miles south of the present town of Chinook which later became known as Old Fort Belknap.

The Fort Belknap Indian Reservation as created by the Act of 1888 lies in Blaine and Phillips Counties with about three-fourths of the land area situated in Blaine County. At the present time the entire Indian population of the Fort Belknap Reservation totals 3,557 but those actually living on the reservation number about 3,000. Inter-marriage between the Cros Ventres and the Assiniboine over the years makes it difficult to distinguish the true blood lines of either tribe.

One of the last major battles between the Indians and the whites took place sixteen miles south of Chinook on Snake Creek. Chief Joseph and his band of Nez Perce Indians decided to leave the Wallowa Valley in the northeastern corner of Oregon, which they had called their home, and crossed over into Montana to find a new residence in Canada. After a long chase by the military and many hardships, Chief Joseph and his followers arrived at Snake Creek, halfway between the Bearpaw Mountains and the Milk River, where they camped under the impression they had arrived in Canada. It was here that General Nelson Miles overtook them and after a fierce battle captured Chief Joseph and remnants of his half-starved tribe of Nez Perce Indians. The battle commenced on September 30 and ended October 5, 1877. From the beginning of the battle the Indians were badly outnumbered, but they gave a good account of themselves. Only 89 of the 400 were warriors; the

balance consisted of old men, women, and children. To save needless bloodshed, Chief Joseph on the fifth day of battle went to General Miles, handed over his gun and declared, "From where the sun now stands, I will fight no more, forever." Today a national monument marks the place where the battle of the Bearpaws was fought and includes a plot of 320 acres commemorating the Indian encampment and battlefield.

There probably never will be another person who lived in the area of Blaine County who will be as well remembered as Charles M. Russell, the famous cowboy artist. One of the many very interesting first-hand stories about him was told by Kid Price, Charlie's old-time friend; it seems that Charlie Russell had once owned a saloon in the town of Chinook for about ten days until he went broke giving away drinks instead of selling them to the customers. Russell was born in St. Louis, Missouri, and at an early age came to Montana by the way of the Union Pacific and Utah Northern Railroad. He arrived at the old Redrock Station which was located six miles south of Armstead in Beaverhead County. From Redrock he traveled by stagecoach to Helena. This uncouth Missouri boy who came to Montana could hardly be expected to go down in history as one of its most famous men; but to those who treasure and love art, the work of Russell, the "cowboy artist," will always be remembered.

There was no real settlement in the area of Blaine County until the Great Northern Railway was completed in that section in 1887. At that time the whole region was Indian Reservation and no one could settle there with any chance of holding a claim.

The Great Northern Railroad advertised the Milk River Valley as the only portion of Montana that could be farmed without irrigation, and almost every 160-acre tract was claimed, especially around the town of Chinook. In the fall of 1889 a man by the name of T. C. Burns came to Chinook from the Yellowstone Valley where he had practiced irrigation. He and his family filed on 1,800 acres of land under the Old Desert Land Act which granted a section of land to each applicant and permitted a homestead in addition to it. Almost immediately Burns started to build a canal from the Milk River to irrigate his claim. The Great Northern Railroad brought suit against him to stop construction of the canal by claiming to have filed a water right for all of the water in the Milk River to be used for the operation of its steam locomotives. The real reason for the court case between Burns and the railroad was that the railroad was afraid the settlers would think irrigation was essential to farming in that area, and since water was not available for all of the farms, many people would not settle there. This case dragged on for several years but was finally decided in favor of Burns and dismissed. In the meantime, about four or five years had elapsed and many of the farmers had left the valley as dryland farming had proved a failure. However, a few of the stockmen and settlers stayed on and completed construction of irrigation canals at Harlem and Chinook. As soon as these projects were started, the settlers again moved into the valley. One of the first irrigation farms in the valley was owned by Thomas M. Everett.

Thomas O'Hanlon, in 1878, was one of the first cattlemen in the area having permission from the government to graze his cattle on reservation land. The cattle had to be closely guarded to keep the Indians from stealing them.

In 1882 Simon Pepin moved his herd in from the west, and following him came Granville Stuart, Con Kohrs, John Bielenberg, and others. Most of these cattlemen had been running their cattle south of the Missouri until they received permission from the government to run them on the Belknap Agency in the summer of 1886.

The severe winter that followed, 1886-1887, was one of the most disastrous ever known to the stockmen of the West. Cattlemen who were considered wealthy in the fall of that year were broke and in debt by spring. Some of them never recovered their losses and simply quit and left the country. John Bielenberg and Con Kohrs lost all they had but salvaged enough to pay their debts. These men were noted for their ability as stockmen and were extended credit to start their cattle operations again. The brand of Con Kohrs was D-Bar-S,and he had his ranch headquarters on Dry Beaver Creek at the east end of the Little Rockies. During the early days of cattle ranching, the cowboy's life was very colorful and these men were seen in many of the small frontier towns and at work on the range lands of Montana.

Some of the early-day sheepmen were B. G. Olson, Nick Bielenberg, and Joe Toomy, who wintered their sheep below the month of the North Fork of the Milk River in the year 1889-90. Jurgon Kohrs was probably the largest sheep rancher in Blaine County.

Blaine County is located in northcentral Montana and was named after James Blaine, the American statesman. The county was created on March 2, 1912 with Chinook as the county seat. Chinook is the largest town in the county with a population of 2,300 people.

The topography of Blaine County is divided into two sections—the plains and mountains—with the plains comprising about two-thirds of the land area. Most of the plains area lies in the northern part of the county and is called "The Big Flat." In this area one can see for miles around because the land is so level. This region is almost solely devoted to grain growing and dryland farming although there are some sheep and cattle ranches in the Big Flat area. The Milk River Valley is located about forty-four miles south of the Canadian border and crosses the county from west to east. This valley is very fertile with most of its land under irrigation. Chinook, the county seat, is located in the Milk River Valley along with the towns of Harlem and Zurich; other towns and small rural communities in the county are Turner, Hogeland, Lloyd, and Cleveland.

Most important transportation facilities in Blaine County consist of the Great Northern Railway, U. S. Highway No. 2, and several bus and truck line companies. Numerous gravel roads provide access to the rural areas.

Blaine County at the last census in 1960 had a population of 8,091 and a land area of 4,271 square miles.

CLIMATE

Bounded on the south by the Missouri River and on the north by the Canadian Border, some 150 to 200 miles east of the Continental Divide, Blaine County topography varies from mountainous southwest and southeast to rolling plains and hills along both sides and to the north of the Milk River. Elevations range from about 2,300 feet M.S.L. where the Milk River leaves the county east of Harlem to nearly 6,000 feet M.S.L. on some of the peaks of the Bearpaw and Little Rocky Mountains. The drainage system is quite complex. The south slopes of the south half drain primarily through Cow Creek into the Missouri; the north slopes drain into Peoples Creek, thence into the Milk River; and the north half is drained by the Milk River, and Lodge and Battle Creeks which join the Milk near Chinook. Most streams flow, for most of their lengths, between south and east.

This topographical complex has the usual effects on climate (most of the time) that one would expect, including the coldest extremes in valley bottoms, earliest warming, following a cold spell, on hillsides, heaviest precipitation in the mountains, etc. The general climate classification approcahes the true "continental" category, with the one important exception of the fairly common cold season "chinook" winds. Although not as frequent nor as strong as these winds blow in the so-called "chinook belt" along the immediate east slopes of the Continental Divide, when they do occur they produce rapid and substantial warming from cold "snap" temperatures. Characteristic of the continental type climate, cold waves may occur several times each winter, with temperatures reaching as low as —20° or —25° at least once in an average winter. The cold may last several days before "chinook" relief arrives, but occasionally a cold wave will follow an earlier cold invasion before the "chinook" can develop. And occasionally, the warming wind will reach only hilltops or mountain slopes, leaving the heavier cold air relatively undisturbed in the valley bottoms. Cold waves, not as much of a hardship now as in earlier years when modern roads, cars, communications, etc., were not available, still can pose serious problems for the unprepared and unwary.

Summers generally are warm and pleasant, with most stormy weather coming in afternoon or evening showers or thunderstorms. Highest temperatures on record for county weather stations have been in the 105° - 110° range, but 100° temperatures are rare. In fact, high temperatures 90° or warmer occur on less than 25 days in an average year — with the greatest frequency at the lower elevations along the Milk River. The average warmest daily temperature in July (warmest month) runs between 85° and 87° over most of the county. Afternoon relative humidity averages about 35 to 40 per cent in July and August over most of the area. While oppressive combinations of heat and humidity may occur, they are infrequent; and when they do occur they last only for a day or two in most cases.

Precipitation varies considerably over the county. In general, there is less over the rolling land north of the Milk River than over the hills and mountains to the south. Amounts up to 25 or 30 inches a year may be expected in Bearpaw and Little Rocky Mountains, but even the drier areas in the north half should average at least 12 inches. While 12 inches would ordinarily class an area as semi-arid, in Blaine County 70 to 80 per cent of the annual average falls during the April 1-September 30 growing season, and June (the most critical plant growing month) averages nearly 3.00 inches at most observing points. Available records indicate annual snowfall to have averaged 35 to 40 inches a year at lower elevations, but it is likely that the mountains of the south half receive 100 inches on the average in some places.

Freeze-free seasons vary considerably from south to north, and some slopes of the south half may have average seasons without a 32° freeze of as much as 130 days. At Chinook the average 32° freeze-free season lasts 119 days, from May 19 to September 15, while Harlem has 115 days—May 22 to September 14. At Turner in the north this season is 112 days, May 26 to September 15. But at Hays, in a valley bottom of the Little Rockies, the average dates, May 26 to September 8, yield only a 105-day season.

Stormy weather of several kinds may occur at times, but most troublesome is the summer thunderstorm which may produce heavy rain, sometimes with hail, gusty winds, lightning, and on rare occasions a small tornado. North winds accompanying cold waves sometimes can cause blizzard conditions for a few hours, and winter "chinooks" on occasion may reach gale force. Occasionally a thundershower will be heavy enough to cause "flash" flooding in creeks or coulees, but usually the

area affected is small. Hail accompanying thunderstorms occasionally will cause damage to growing or ripening crops, and less frequently to roofs, windows, etc., but hail damage usually affects only a small part of the county in any one year. Fields that are hit, however, can sustain considerable crop damage. When snow runoff and rainfall combine in early spring (usually near April 1), flooding along the Milk River may occur, but this combination occurs only about once in 20 or 25 years.

A table of summarized data follows:

Precipitation

		Yearly Average	Growing Season Average	Percent Falling in Growing Season	Wettest Year	Driest Year
Chinook (el. 2420)	1896-1965	12.52*	9.25	74	21.45—1927	6.44—1910
Cleveland (el. 3330)	1957-1965	13.26	10.24	77	22.57—1965	7.22—1960
Harlem (el. 2371)	1924-1965	12.30*	8.95*	73	20.50—1938	8.34—1956
Hays (el. 3530)	1940-1964	14.70	10.90	74	21.95—1953	9.74—1960
Hogeland 7WSW (el. 3350)	1951-1965	12.15	9.79	81	15.96—1954	8.17—1960
Turner (el. 3045)	1932-1965	11.85‡	9.46‡	80	19.07—1965	7.05—1934

*1931-1960
‡1932-1960

Temperature

		Highest of Record	Lowest of Record	January Average	July Average	Annual Average
Chinook	1896-1965	110	—51	13.6*	70.3*	42.7*
Cleveland	1957-1965	107	—36	19.3	67.9	42.2
Harlem	1924-1965	107	—50	12.2*	69.8*	41.9*
Hays	1947-1964	102	—35	17.4	66.7	42.9
Turner	1932-1965	106	—44	12.1‡	68.2‡	40.6‡

*1931-1960
‡1932-1960

SOILS

The soils of Blaine County are primarily of four distinct types. These are glacial, alluvial, terrace, and mountain, with glacial comprising the larger acreage.

Local rock formations furnish the material for soils found in a given area. The physiography, drainage, and geologic history influence how these materials were deposited, and account for many of the differences found in soils. Soil depth, texture, and acidity or alkalinity are directly related, within limits, to the material from which the soil is formed.

The variations in soils result from the alteration of geologic material either in place or transported, by climate and living organisms, and especially vegetation. The length of time these forces have been active and the topography is particularly influential in causing visible soil differences over short distances, often within a few feet.

Glacial Soils

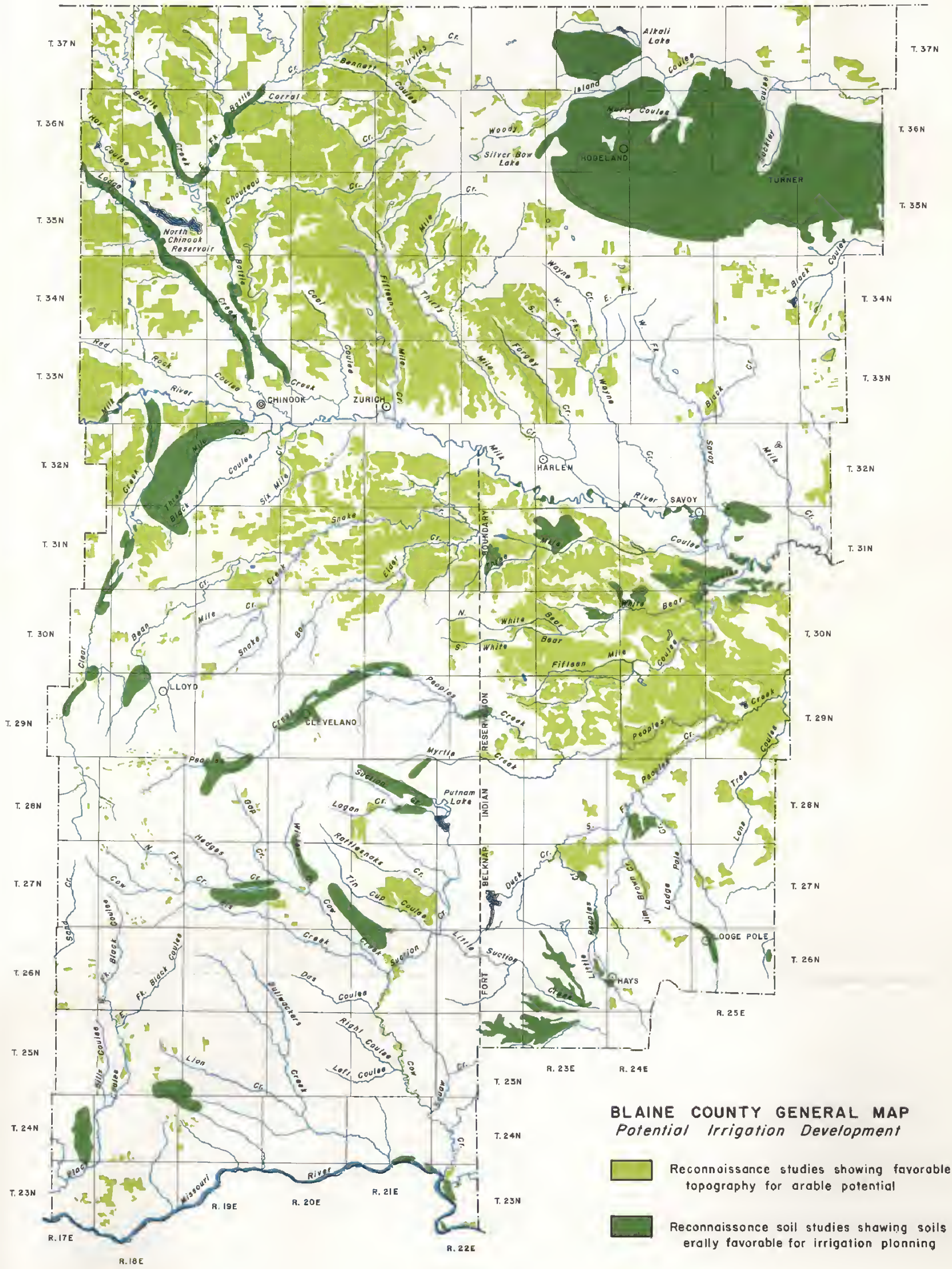
The major event in the geologic history that influenced the soils of Blaine County was continental glaciation. Sand, silt, clay, gravel, and boulders were picked up by the ice sheet which mixed them by crushing them and then redeposited the mixture known as glacial till. The soils are generally underlain by glacial till, the nature of which is determined by the mixture in the path of the ice sheet. During the retreat of the ice the running water segregated the material according to particle size. The coarse materials, sand and gravels, usually settled out near the margins of the ice, and the fine materials, silt and clay, settled out further from the ice margins and were often deposited in bodies of still water such as ponds and lakes. Material sorted and deposited by the melt is called glacial outwash or glacial drift.

The glacial soils of Blaine County cover a more extensive area than any other type. There are an estimated 610,000 acres which are topographically suitable for consideration of irrigation planning. A reconnaissance survey shows an estimated 154,000 acres of the glacial plains to have soils warranting such planning. The remaining 456,000 acres need further investigations to determine what acres might be considered for future irrigation.

Generally, the rolling topography, heavy-textured and high saline till substratum, together with alkaline (Solodized-Solonetz) surface soils, might prove the expense of drainage, soil treatment, and land development too costly to be considered economically feasible for irrigation. This condition prevails over large areas of Blaine County; the glacial soils, however, do produce well for dryland farming and grazing lands.

North of the Milk River, Blaine County has a rolling glacial terrain that is principally utilized for livestock grazing land. In this section there are also a few scattered areas of dryland farming. The predominant Solodized-Solonetz soils, known as the Phillips Series, have a rich brown, heavy, tough clay layer from 6″ to 15″ below the surface. The high alkaline type layer restricts root growth. The areas with shallow Solodized-Solonetz type soils have a desolate appearance characterized by a surface having 20 to 60 percent bare spots known as "scabland," "slick spots," or "blowouts." The depth to the glacial drift parent material is generally 18″ to 24″ which prohibits drainage of these areas. In general, the Phillips Series should not be considered for irrigation planning purposes.

DOMINION OF CANADA
SASKATCHEWAN



BLAINE COUNTY GENERAL MAP
Potential Irrigation Development

Reconnaissance studies showing favorable topography for arable potential

Reconnaissance soil studies showing soils generally favorable for irrigation planning

The exception to the general glaciated pattern north of the Milk River in Blaine County is the large upland area known as the "Big Flat." The overall size of this area is estimated at 132,000 acres. The soils, loam textured, are well developed over a friable loam ranging to a clay-loam glacial till underlain by gravel and sand which indicates that the glacial deposits are situated over high terrace gravels. The general terrain is split into two large main and several smaller broad glacial melt water valleys. The soils of the broad valleys are of either sandy or loamy materials over loose sand gravels occuring at an estimated 20" to 30" depth.

The "Big Flat" area warrants consideration for irrigation in those sections limited to the gently sloping, smooth terrain and soils which have adequate water holding capacity. The principal limiting factor is the water supply although underground water bearing gravels are within reach of turbine type irrigation pumps. The quantity of water known to be available is sufficient to irrigate a sizeable area. However, this source of water would have to be subjected to further study as to quality, quantity and source before consideration should be given to any large scale irrigation developments.

The glaciated area of Blaine County extends south of the Milk River Valley, and the topography generally is quite rolling in nature with large boulders and smaller cobble strewn over the surface terrain. Those areas now being dryland farmed first had to be cleared of these obstructions. The soils are dark grayish-brown with three essential layers; the surface layer may range in thickness from 1" to 4" and forms a loose powdery mulch; the silty layer varies from 8" to 15" and is a rich dark brown color, this is compact and usually has a well defined columnar structure; below this structure is a layer of high carbonate accumulation which is underlain by the parent material of grayish-brown calcareous glacial drift.

The texture of glacial drift varies, but generally it is of a heavy, tight compact nature and restricts drainage to the extent that irrigation in such areas would be of doubtful value.

There are, however, exceptions to the general trends of the glaciated areas south of the Milk River. Several areas occur on a gently sloping, undulating till plain that have a dark colored deep loam and a clay loam glacial soil. The largest of these areas is an estimated 13,200 acres of glacial upland east of Clear Creek; this acreage is of sufficient size to warrant irrigation planning studies. Other areas which might be considered for future irrigation and located on the Fort Belknap Indian Reservation are scattered with the largest section comprising 2,000 acres; however, several of these areas can be reached with one canal. The soils are shallower in character and over till; the topography is more rolling and complex than the Clear Creek area. There is a total of 8,900 acres within this scattered section which could be included in any future studies for irrigation planning.

Alluvial Soils

These soils occur along streams of Blaine County, the largest stream being the Milk River. The soils owe their distinguishing characteristics mainly to the influence of their parent material, but also to some extent to the degree of development under the agency of soil-forming processes. The material below the surface is essentially the same as it was at the time of deposition. Most of the alluvial soils in Blaine County are found along the Milk River Valley and some are also found in every stream or drainage throughout the county.

The extreme fine textured soils, which tend to predominate in the Milk River Valley, can be related to the parent materials. Most streams entering the Milk River Valley pick up a large part

of their sediments from shales of the Bearpaw formation. These shales also contribute to the high salt and alkali content throughout the valley. The local names of the heavier textured soils are the Bowdoin, Harlem clay and Orman clay loam series; these soils are formed from various outwash materials of the shale formations that outcrop in the breaks bordering the valley. The clays are somewhat uniform in physical characteristics, but a number of variations exist. In places the clay depth is 48" or more and has no light textured substratum; in other areas a sandy substratum may occur. The use of these soils for irrigation depends upon the depth to the sandy substratum—the soils where the light textured substratum is within 36" of the surface can be utilized by growing western wheatgrass (blue joint) and some alfalfa hay crops. The soils where the light textured substratum is as much as 48" below the earth surface have become saline and alkaline-saline in nature, and many such areas have been withdrawn from irrigated land use.

There are large areas of alluvial soils which are light to medium textured loams and clay loams. Irrigated agriculture is proving profitable on large acreages of such soils of which a substantial amount is located in the Chinook area. Additional drainage facilities, however, are needed in some of the areas to enhance the accrual of agricultural benefits. There are 4,000 acres immediately adjacent to the Milk River that are suitable for developing irrigation, but land leveling and clearing of decidious trees is a prerequisite.

The Bearpaw and Little Rocky Mountains are located in the southwestern and southeastern portions of the county. The glacial plains flank these mountains. There are streams heading in the mountains and flowing in the northeast direction to their termination into the Milk River. The main streams which have areas of land being irrigated and arable lands which can be developed are Peoples, Little Peoples Creek and Clear Creek. The alluvial soils in these narrow valleys are very dark colored loam to clay loams which are relatively free of salinity and comprise an estimated 11,000 acres which could be considered for irrigation planning if adequate water supplies were available.

There are numerous small creeks on the north side of the Milk River which have narrow alluvial valleys of saline and alkaline soils. The parent material which these streams meander through is mainly Bearpaw shales which add an undesirable alluvium wash of heavy alkaline material to stream valleys. The two main forks of the Milk River are Lodge and Battle Creeks where there are situated small tracts of presently irrigated land, and an additional 11,000 acres that could be considered for future irrigation planning. The soil is relatively free of salinity and consists of a very dark colored loam to clay loam texture. These streams head in Canada and the alluvium deposits are of a more desirable texture and salinity for irrigation planning than most creeks north of the Milk River.

The southern portion of Blaine County is bordered by the deep valley of the Missouri River. The immediate area next to the Missouri Valley is composed of rough badlands. The river valley is narrow and only small alluvial bottoms total 500 acres of land meriting future irrigation planning studies. There are several creeks which head in the Bearpaw and Little Rocky Mountains and flow south into the Missouri River. The glacier did not reach this area and there are several sizeable, high, and nearly level unglaciated stream terraces bordering the small creeks. These benches are large and the soils consist of deep loam to clay loam over gravelly loam and clay loam materials with good water holding capacity. The problem of irrigation planning on these benches is water supply. However, these benches may be considered eventually for projects with high pump lifts from the Missouri River or nearby streams. Future irrigation planning of these benches could embrace a total area of 28,000 acres.

Irrigation of Blaine County alluvial soils has presented many alkali, saline, and drainage problems. The main problem is the heavy textured clay soils which are not yielding a high cash crop; the principal use of these soils is the growing of bluestem hay for livestock. Many acres of this type have been withdrawn from irrigation. There are, however, large acreages of light to medium textured soils which are producing good yields of barley, alfalfa, irrigated pasture, and small acreages of potatoes and sugar beets.

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CROPS AND LIVESTOCK

Blaine County comprises an area of 2,730,880 acres of which 1,204,124 acres are classified as rangeland and 322,805 acres as cultivated land. The balance of 1,203,951 acres in the county is contained in other lands such as government owned (state or federal) or Indian Reservation land. In 1959 there were 685 farms or ranches in Blaine County with an average size of 3,243 acres.

Blaine County is primarily a grain and cattle producing county. The total county income for all agricultural sources fluctuates between $11-million and $14-million depending on the national economy and markets.

Wheat and barley are the main grain crops. Principal changes in the agricultural production on dry land include an increasing amount of land planted to barley. Wheat growers are holding onto the wheat acreage allotments but are also adding acreages of other cultivated crops. Yields of wheat from dry land will vary from fifteen bushels on the poorer land to as high as thirty to thirty-five bushels on the better dry land areas south of the Milk River. In the year 1964, the average county wheat production was twenty-six bushels per acre although this figure may be a little high for an average of ten years or more.

As compiled by the Water Resources Survey, there are 69,985 acres irrigated in Blaine County with 15,715 potential irrigable acres under existing ditch facilities.

Irrigation in Blaine County consists of an irrigation project developed by the Bureau of Reclamation known as the Chinook Division of the Milk River Project which includes the Fort Belknap, Alfalfa Valley, Zurich, Paradise Valley, and Harlem Irrigation Districts. There are several hundred acres of land irrigated by private users by pumping from the Milk River under contract by the Bureau of Reclamation. Other irrigation projects are the Fort Belknap Indian Project and the North-Chinook Irrigation Association, a private corporation. Several other small private reservoir storage projects are located in the county.

On the irrigated land, there has been a reduction in the sugar beet acreage contracts and at present only 1,500 acres are irrigated. Alfalfa hay is the principal crop on the irrigated land and accounts for more than one-half of all the irrigated acreage.

The Bearpaw Mountain area constitutes the better part of the grazing section of the county. This upland area has elevations as high as 4,500 feet and is covered by a good succulent mountain-type vegetation. The northern part of the county (north of the Milk River) is of a prairie-type range and the product of glacial formations and, which for some reason, has less rainfall and less fertile soil. In the northern part of the county, the rangeland is inhabited with a great deal of grama grass with the creek bottoms and drainages in the area predominantly Western Wheatgrass.

Much of the northern part of the county is used for summer grazing with a considerable amount of the land being recultivated and reseeded to better adapted species of grasses. In the future this will no doubt help to increase the income of the county.

Aside from the strictly grain farming operations in the Big Flat area and a few other areas in the southern part of the county, most of Blaine County is either straight stock ranching or a combination of grain and livestock. Recent figures secured from the 1966 tax rolls show the following: All cattle—66,500 head—of this number 36,000 are stock cows, 20,000 are coming yearlings, and 7,500 are coming two-year-olds. The 1966 assessment rolls also show a total of 25,300 head of sheep, which is a substantial reduction from the 1964 figure.

Most of the livestock is disposed of in the sale of fall calves or yearlings. At the present, there is not a great deal of livestock feeding carried on, although there is a considerable amount of livestock wintered in the county. This is made possible because of a good supply of hay and grain raised in the valley.

Fattening operations are limited to possibly a dozen feedlots. It is estimated that the average figure for livestock placed in feedlots would be 5,000 to 6,000 per year. The opportunties for livestock fattening seem to be present, but this industry has not developed like it should with the abundant supplies of barley and hay available for this type of operation.

The county is strictly a feeder livestock exporting county and produces a good quality of feeder calves for market that are generally available to livestock producers who want to sell their calves or yearlings.

Other types of livestock, such as sheep, are declining steadily with the number of sheep at the lowest point ever recorded, and many of the sheepmen are now changing over to cattle raising.

There has been some increase in the swine industry of late but not anywhere near the proportions that this industry attained many years ago.

Enterprise	Percent Income
Cattle	41.5%
Wheat	32.9%
Dairy	3.5%
Sheep Wool	4.8%
Other livestock	3.8%
Other crops	4.8%
Sugar beets	2.6%
Barley	6.1%
	100.0%

ESTIMATED FIGURES FOR 1965 BY COUNTY EXTENSION SERVICE

Crop	Acres	Value
Sugar beets	2,700	$ 442,000
Corn silage (irrigated)	1,000	100,000
Oats (dryland and irrigated)	5,800	125,000
Barley (1,200,000 bu.)	51,500	1,000,000
Mustard	800	5,000
Flax	800	9,600
Potatoes	160	47,000
All hay	67,200	2,200,000
Alfalfa hay (part of all hay total)	33,600	1,500,000
Alfalfa seed	900	40,000
All wheat	90,000	2,970,000
Total Estimated Value		$6,938,600

INCOME

No. Farms	Gross Income
42	- $40,000
108	$20,000 - $39,999
172	$10,000 - $19,999
158	$ 5,000 - $ 9,999
69	$ 2,500 - $ 4,999
26	$ 50 - $ 2,499

Other Farms—Part Time

107	$ 50 - $ 2,499
51	Retired Farmers, some income
Total livestock value	$6,828,200

Livestock on Farms:

Pigs	5,000 head
Sheep	49,000 head
All cows	83,000 head
Average size of farm	3,388 acres
Average cash receipts per farm	$16,248

STREAM GAGING STATIONS

The U. S. Geological Survey measures the flow of streams, cooperating with funds supplied by several state and federal agencies. The results have been published yearly in book form by drainage basins in Water-Supply Papers through the year 1960. Beginning with 1961, the streamflow records have been published annually by the U. S. Geological Survey for the entire state under the title, "Surface Water Records of Montana." Data for 1961-65 and subsequent five year periods will be published in Water-Supply Papers. Prior to general issuance, advance copies of station records may be obtained from the U. S. Geological Survey. That agency's records and reports have been used in the preparation of this resume.

Data given below cover the stream gaging records, which are available for Blaine County from the beginning of measurements through the water year 1965. This water year begins October 1 and ends September 30 of the following year.

Following are equivalents useful in converting from one unit of measurement to another:

(a) In Montana, one cubic foot per second equals 40 miner's inches.

(b) One acre-foot is the amount of water required to cover an acre one foot deep.

(c) One cubic foot per second will nearly equal two acre-feet (1.983) in 24 hours.

(d) A flow of 100 miner's inches will equal five acre-feet in 24 hours.

(e) One miner's inch flowing continuously for 30 days will cover one acre 1½ feet deep.

For reference purposes, the stream gaging stations are listed in downstream order.

Missouri River at powerplant ferry, near Zortman*

The water-stage recorder is at powerplant ferry, 1½ miles downstream from Woodhawk Creek and 22 miles southwest of Zortman. The drainage area is 40,763 square miles. Records are available from February 1934 to date (1966). The maximum discharge was 137,000 cfs. (June 6, 1963) and the minimum, 1,120 cfs. (July 8, 1936). The average discharge for 31 years (1934-65) was 8,672 cfs. or 6,278,000 acre-feet per year. The highest annual runoff was 10,300,000 acre-feet (1948) and the lowest, 3,213,000 acre-feet (1937). There are diversions for irrigation of about 850,000 acres above the station. Flow is regulated by numerous reservoirs.

Clear Creek near Bearpaw

The wire-weight gage was 200 feet downstream from Wind Creek, 8 miles north of Bearpaw, and 18 miles southeast of Havre. The drainage area is 69.6 square miles. Records are available from May 1918 to November 1921 (no winter records except 1921). The maximum discharge was not determined, and there was no flow at times. There are some diversions for irrigation above the station.

Fort Belknap Canal near Chinook

The water-stage recorder was at highway bridge three-quarters of a mile downstream from headgates of canal on Milk River, 1 mile northeast of Lohman, and 8 miles west of Chinook. Seasonal records are available from July 1903 to September 1921. The maximum daily discharge was 237 cfs. (May 31, 1906) and the minimum, no flow on many days each year. The canal diverts water from left bank of the Milk River in SE¼ of Section 20, T. 33N—R. 18E to irrigate lands on the north side of the river.

Milk River at Lohman

The water-stage recorder was at highway bridge half-a-mile downstream from Fort Belknap Dam and three-quarters of a mile north of Lohman. The drainage area is 6,166 square miles. Records are available from June 1918 to August 1921 (irrigation season only), October 1922 to December 1925, March 1934 to September 1951. The maximum discharge was 3,450 cfs. (March 21, 1939) and the minimum, no flow at times. The average discharge for 20 years (1922-25, 1934-51) was 274 cfs. or 198,400 acre-feet per year. The highest annual runoff was 300,500 acre-feet (1951) and the lowest, 102,200 acre-feet (1941). The flow has increased by water from St. Mary Canal since 1917 and is regulated by Fresno Dam since 1939. Diversions for irrigation of about 5,000 acres above station. Fort Belknap Canal diverts water half-a-mile above station for use below.

New Paradise Valley Canal near Chinook

The water-stage recorder was 500 feet upstream from siphon, 1¼ miles downstream from headgates, and 3½ miles southeast of Chinook. Seasonal records are available from May 1906 to June 1908 and June 1920 to August 1921. The maximum daily discharge was 114 cfs. (June 24, 1921) and the minimum, no flow most of the time. The canal diverts water from the Milk River in the NW¼ of Section 6, T. 32N—R. 20E.

North Chinook Canal near Havre*

The water-stage recorder is 1 mile downstream from headworks of canal, 4 miles upstream from North Chinook Reservoir, and 20 miles northeast of Havre. Records are available from April 1921 to September 1924 (irrigation season, fragmentary), May 1928 to October 1951, March 1952 to present (1966), seasonal records only. The maximum daily discharge was 174 cfs. (April 6, 1958) and the minimum, no flow at times in each season. The canal diverts water from the left bank of Lodge Creek in Section 3, T. 35N—R. 17E, and this water is then stored in North Chinook Reservoir for irrigation of lands north of Chinook between Lodge Creek and Battle Creek.

Reser Ditch near Chinook

The staff gage was 1 mile downstream from headgates of ditch on Lodge Creek and 10 miles northwest of Chinook. Records are available from April to August 1905 and April to June 1906. The maximum daily discharge was 10 cfs. (May 29, 1906) and the minimum, no flow most of each year. Water is diverted from Lodge Creek for irrigation of lands north of Chinook.

West Fork Ditch near Chinook

The staff gage was 200 feet downstream from headgates and 4½ miles north of Chinook. Seasonal records are available from June 1905 to August 1907. The maximum daily discharge was 34 cfs. (May 31, 1906) and the minimum, no flow most of each year. Water is diverted from Lodge Creek for irrigation of lands north of Chinook.

Battle Creek at international boundary*

The water-stage recorder is 600 feet north of international boundary in Saskatchewan, 8 miles upstream from Woodpile Coulee, and 30 miles north of Chinook. The drainage area is 931 square miles. Records are available from April 1917 to date (1966), seasonal records only for most years. The maximum discharge was 5,820 cfs. (April 15, 1952) and the minimum, no flow at times in most years. Natural flow of the stream is affected by storage reservoirs, diversions for irrigation and return flow from irrigated areas. Water may be diverted into or from Frenchman River basin through Cypress Lake. This is one of a number of stations which are maintained jointly by Canada and the United States.

East Fork Battle Creek near international boundary*

The water-stage recorder is 2 miles south of international boundary, 5½ miles upstream from Lyons Creek, and 26 miles north of Chinook. The drainage area is 89.5 square miles. Records are available from March 1927 to date (1966), seasonal records only in most years. The maximum discharge was 2,300 cfs. (July 12, 1955) and the minimum, no flow for most of each year. No diversions above the station. This is one of a number of stations which are maintained jointly by the United States and Canada.

Lyons Creek at international boundary*

The water-stage recorder is half-a-mile north of the international boundary, 8 miles south of Anena, Saskatchewan, and 28 miles north of Chinook. The drainage area is 66.7 square miles. Records are available from March 1927 to date (1966), seasonal records only in most years. The maximum discharge was 1,220 cfs. (July 6, 1955) and the minimum, no flow for most of each year. Natural flow of stream affected by small stock-water dams above the station. This is one of a number of stations which are maintained jointly by Canada and the United States.

Battle Creek near Chinook

The wire-weight gage was at county road bridge, 3½ miles north of Chinook, and 7 miles upstream from mouth. The drainage area is 1,539 square miles. Records are available from April 1905 to September 1921 (seasonal records only for most years). The maximum discharge observed was 10,960 cfs. (June 8, 1906) and the minimum, no flow at times in most years. There are many diversions above the station.

Cook Canal near Chinook

The staff gage was at railway trestle half-a-mile downstream from headgate and 3 miles east of Chinook. Seasonal records are available from April 1905 to June 1919. The maximum daily discharge was 71 cfs. (April 17, 1914) and the minimum, no flow most of each year. The canal diverts water from Battle Creek and is flumed across the Milk River to irrigate land on the south side of the Milk River.

Matheson Canal near Chinook

The water-stage recorder was 75 feet downstream from headworks of canal and 3.9 miles east of Chinook. Records are available from April 1905 to October 1921, May 1928 to September 1949, October 1950 to October 1959 (seasonal records only in most years, except 1956-59 when total diversion during season only was published). The maximum daily discharge was 30 cfs. (April 1, 1915), caused by wash-out of canal headgates, and the minimum, no flow at times in each year. Canal diverts water from right bank of Battle Creek for irrigation of lands between Battle Creek and Milk River.

Paradise Valley Canal near Chinook

The staff gage was 30 feet downstream from flume of Cook Canal, 300 feet downstream from headgate, and 6 miles east of Chinook. Seasonal records are available from August 1903 to September 1919. The maximum daily discharge was 32 cfs. (June 27, 1911) and the minimum, no flow most of each year. The canal diverts water from the Milk River for irrigation of land on the south side of the Milk River Valley.

Harlem Canal near Zurich

The water-stage recorder was 500 feet downstream from headgates and 1½ miles southeast of Zurich. Seasonal records are available from May 1904 to September 1921. The maximum daily discharge was 97 cfs. (May 4, 1921) and the minimum, no flow for most of each year. Canal diverts water from the left bank of the Milk River in Section 33, T. 33N—R. 21E for irrigation of lands on the north side of the river near Harlem.

Agency Ditch near Harlem

The staff gage was on foot bridge, 500 feet downstream from headgate, and 4 miles south of Harlem. Seasonal records are available from July to September 1905, April 1910 to July 1920. The maximum daily discharge was 128 cfs. (May 28, 1916) and the minimum, no flow for most of each year. Water is diverted from south bank of the Milk River in Section 32, T. 32N—R. 23E for irrigation of lands on the Fort Belknap Indian Reservation.

Milk River near Harlem*

The water-stage recorder and wire-weight gage are located at the bridge on U. S. Highway #2, 3 miles southeast of Harlem, and 6 miles upstream from Thirty-Mile Creek. The drainage area is

9,822 square miles. Records are available from October 1959 to date (1966). The maximum discharge was 6,600 cfs. (April 19, 1965) and the minimum, 6.4 cfs. (April 3, 1961). The average discharge for 6 years was 340 cfs. or 246,100 acre-feet per year. The highest annual runoff was 620,300 acre-feet (1965) and the lowest, 116,200 acre-feet (1963). Flow is regulated by Fresno Reservoir. There are diversions for irrigation of about 60,000 acres of which about 13,000 acres lies below station.

Partial Record Stations and Miscellaneous Discharge Measurements

In order to provide information on more streams than are covered by stream gaging stations, the U. S. Geological Survey has for several years been collecting some partial records. These are in addition to the miscellaneous discharge measurements which have always been reported. These partial records, when correlated with simultaneous discharges of nearby continuous-record stations give fair indications of available flow.

There is one crest-stage partial-record station in the Milk River Basin in Blaine County. This station is now (1966) being operated on a tributary to the Milk River near Lohman.

* This gaging station is now in operation (1966).

Reservoirs

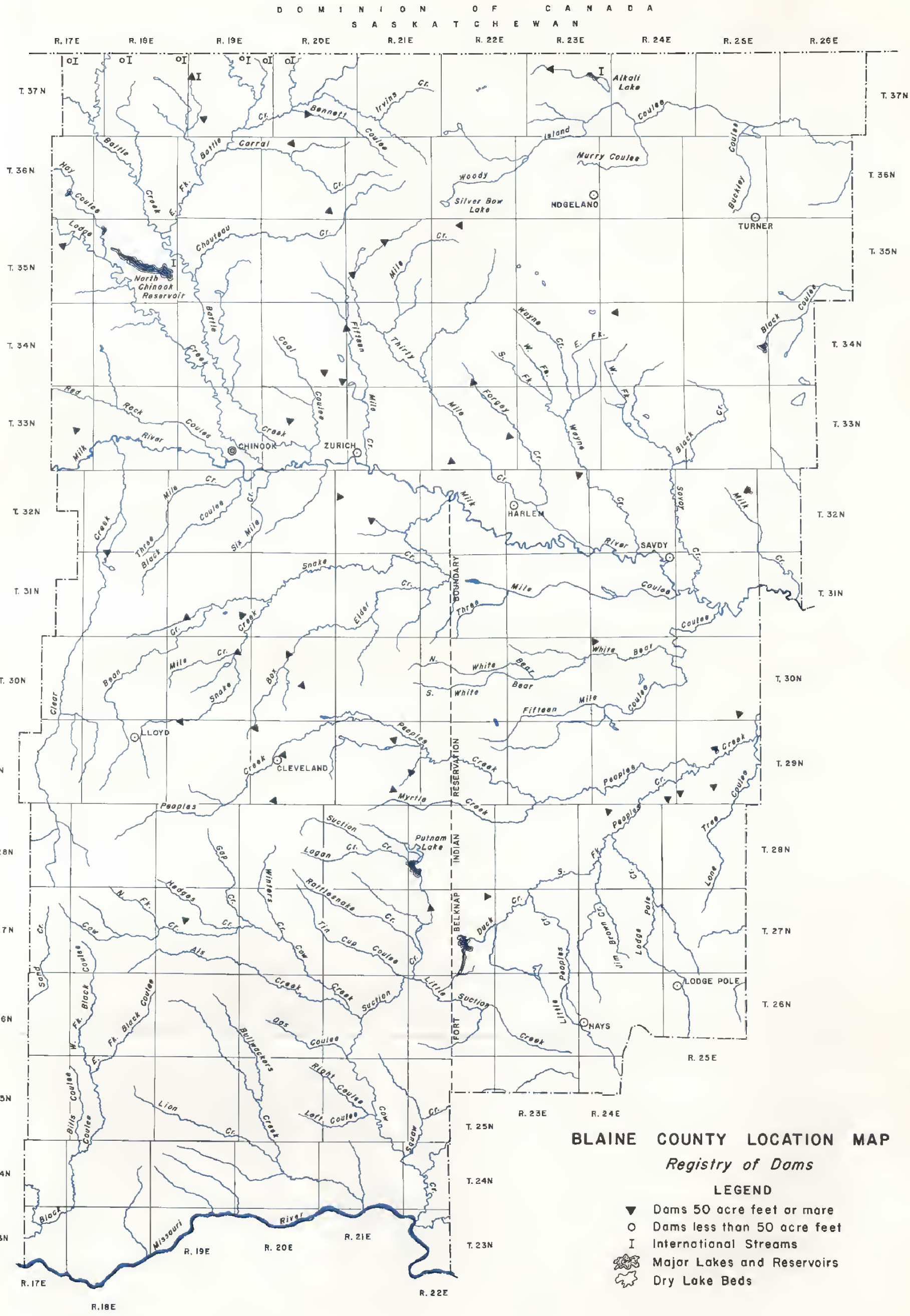
There are no records published by the U. S. Geological Survey for reservoirs in Blaine County.

DAMS AND RESERVOIRS

The State of Montana has no statutes governing the design or construction of dams and, except for projects which the State Water Conservation Board has constructed, the Board has no means of automatically obtaining information concerning design specifications, storage capacities, locations, or ownerships of dams and reservoirs built throughout the State. Consequently, steps have been taken to make this information available for use by the State, the Federal Government, and private citizens.

By means of a questionnaire, the State Water Conservation Board recently obtained from the various federal agencies who design structures, the basic engineering data, locations, and ownerships of dams and reservoirs for which they either have, or had, responsibility and which have storage capacities of 50 acre-feet or more. The contributing federal agencies were the Soil Conservation Service, the Forest Service, the Bureau of Reclamation, and the Bureau of Land Management. The Montana Power Company also participated in the study.

Information on numerous dams and reservoirs constructed by private individuals in Montana is not available and is, therefore, omitted. However, the Board's Water Resources Survey crew, while working in Blaine County, obtained information on private dams and reservoirs within this county. The available information obtained from all sources was compiled by the Board for each county in the State and a list of dams and reservoirs which store 50 acre-feet or more of water was published.



BLAINE COUNTY LOCATION MAP

Registry of Dams

LEGEND

- ▼ Dams 50 acre feet or more
- O Dams less than 50 acre feet
- I International Streams
- Major Lakes and Reservoirs
- Dry Lake Beds

In Blaine County there are sixty-six reservoirs having capacities of 50 acre-feet or more; three of these reservoirs store between 500 and 1,000 acre-feet of water, and one stores 7,000 acre-feet.

The main International streams which rise in Canada and flow into Blaine County are Lodge Creek and Battle Creek. On Lodge Creek in Blaine County there is one reservoir having a capacity of 50 acre-feet or more. On Battle Creek and its International tributaries there is one reservoir having a capacity of 50 acre-feet or more. On minor International streams and coulees in Blaine County there is one reservoir having a capacity of 50 acre-feet or more, and there are seven others having capacities less than 50 acre-feet.

GROUNDWATER

Geology

The groundwater potential of Blaine County is closely related to geologic history and to events which took place during the advance and retreat of Pleistocene ice sheets. These events began approximately 1,000,000 years ago. The advance of the ice in northern Montana was part of a continental pulsating encroachment of multiple sheets of ice from the Hudson Bay region into the temperate zone.

Expanding glaciers flowed out of Canada into Blaine County, across the old Missouri River channel, and as far south as the northern edges of the Bearpaw and Little Rocky Mountains. The Missouri River, thus diverted from its channel, never returned to its former course but began a new regimen south of the Bearpaw-Little Rockies buttress which has continued to this day.

Following the final northward retreat of the ice from Blaine County about 50,000 years ago, the Milk River occupied the old Missouri River bed, and a new tributary system was implemented. The Milk River drainage system is still in the process of adjusting to the physiography of the glaciated plain.

The earth material carried into Montana with the advancing ice and abandoned with the melt water consists of unsorted fine-grained clastic sediment having very poor to no permeability. This mantle of glaciel till and moraine locally includes outwash deposits, which are mixtures of sands, gravels, and boulders left behind in meltwater channels that originated as tunnels or cracks in the ice, and in marginal ridges deposited at the edges of the ice. The coarse material was deposited in the shape of ribbons and terraces. The overall thickness of the glacial mantle varies from a thin patchy veneer to about 200 feet. The effects of ice movements across Blaine County are evident today in the numerous undrained surface depressions, the rolling and hummocky topography, the alkaline rocky clay soil, and the flood-threats of the Milk River.

The major direction of ice movement in Blaine County was from northwest to northeast, over gently rolling plains, river terraces and valleys, and low hills. Evidence of glacial movement has been detected at elevations of almost 4,000 feet above sea level, and erratic debris has been reported at even higher elevations in the Bearpaw Mountains. The plateau in portions of eleven townships in northeastern Blaine County escaped severe glacial scouring due to its elevated posi-

tion. This elevated plateau, the Big Flat, has an economical supply of good groundwater in pre-glacial terrace gravels. The glacial moraine north of the Big Flats contains outwash deposits which are fair aquifers.

A portion of Blaine County between the Milk and Missouri Rivers is unglaciated. The physiography here is dominated by the Bearpaw and Little Rocky Mountains. The mountainous areas are surface expressions of structural uplift which pre-dated the ice invasion. As a result of uplift, bedrock formations were raised in the form of large subcircular domes. Deep erosion followed, exposing once-buried sandstones and limestones to precipitation. In the Bearpaw Mountains this erosion was followed by a volcanic period during which tuffs and lavas were extruded over the top of the eroded uplift. Numerous shallow thrust faults, particularly south and southeast of the Bearpaw Mountains, are associated with the volcanic period. The Little Rocky Mountains were subjected to igneous intrusions, visible today in the exposed hard-rock core of the mountains.

Bedrock formations dip away in all directions from the tops of the structural uplifts. Regional dip continues uninterrupted, except for shallow faulting, into the subsurface to the bottom of the Hogeland Basin and the Cow Creek synclines. It is mainly this structural relief, on the order of about 4,250 feet on the deep formations, which makes artesian wells possible. Many springs in the County are due to the combined effects of structural dip and depth of erosion on the flanks of the uplifted areas.

Aquifers

Groundwater sources in Blaine County are either water table aquifers or artesian aquifers. Generally, the unconsolidated rocks are water table aquifers and the bedrock formations are artesian aquifers. There are local exceptions, and some aquifers exhibit characteristics of both types. The aquifers are discussed individually in sequence of geologic age, the youngest first. Well data has been obtained from Groundwater Appropriation Records.

Alluvium (Quaternary)—is stream and river deposits, composed of silt, sand, gravel, and clay, mixed and interbedded, of recent geologic age and normally unconsolidated or only weakly cemented. The Milk River valley contains two alluvial series. The lower series is Missouri River alluvium, and the upper is Milk River flood plain alluvium. Both series carry some water, frequently insufficient in quantity and poor in quality. The total alluvial interval in the Milk River valley including intervening glacial till attains a thickness of 100 to 200 feet. Water is available in sand and gravel from depths of 20 to 200 feet. Shallow water above 50 feet is considered "bad" even for stock. Quicksand water is only seldom used due to the fact that much loose sand is pumped with the water. Alluvium in the tributary valleys usually has a higher percentage of gravel than in the Milk River valley and usually yields enough water for both domestic and stock use. In valleys of the Little Rocky Mountains, gravels supply water to large springs. Along the county line, Missouri River alluvium is almost 100 feet thick and has a patchy distribution.

Glacial Till (Quaternary)—is seldom an aquifer due to the high percentage of fine impervious material. Outwash and ice-margin deposits within the till are much coarser and permeable, and are fair aquifers if a dependable source of recharge exists. In the northeastern corner of the county outwash gravels are a significant supplier of well-water.

D O M I N I O N O F C A N A D A

S A S K A T C H E W A N

BLAINE COUNTY GROUNDWATER INVENTORY

COMPILED FROM DATA AVAILABLE AS OF MAY 1, 1967

R. 17 E · R. 18 E · R. 19 E · R. 20 E · R. 21 E · R. 22 E · R. 23 E · R. 24 E · R. 25 E · R. 26 E

T. 37 N · T. 36 N · T. 35 N · T. 34 N · T. 33 N · T. 32 N · T. 31 N · T. 30 N · T. 29 N · T 28 N · T. 27 N · T. 26 N · T. 25 N · T. 24 N · T. 23 N

HOGELAND BASIN

COBURG SYNCLINE

CHERRY SYNCLINE

BEARPAW ARCH

SOUTHERN LIMIT OF GLACIATION

BEARPAW MOUNTAINS

UNGLACIATED AREA

ADVANCED ROCKY MTNS

COW CREEK SYNCLINE

BELKNAP INDIAN RESERVATION BOUNDARY

HOGELAND · TURNER · CHINOOK · ZURICH · HARLEM · SAVOY · LLOYD · CLEVELAND · LODGE POLE

Alkali Lake · Silver Bow Lake · North Chinook Reservoir · Putnam Lake

Milk River · Missouri River

Compiled from reports of the U. S. Geological Survey, the Montana Bureau of Mines & Geology, and others.

drafted by p. kane

SCALE

6 mi. · 17 mi.

- *Milk River Flood Plain Deposits and Tributory Alluvium — yields small to moderate supplies of highly mineralized water*
- *Big Flat Gravels — ample supply of good quality water, suitable for limited irrigation*
- *Northern Glaciated Plain — till is an undependable source, bedrock aquifiers yield moderate supplies of mineralized water*
- *Glaciated Area South of Milk River — predominantly bedrock aquifiers*
- *Remnants of Stream Terraces, Unglaciated (U)/Glaciated (G) — unreported groundwater potential*
- *Missouri River Alluvium — yields small supply mineralized water*
- *Other Alluviums — unreported potential*
- *Unglaciated Area*

[S] *Reported Subirrigation Area*

(S) *Reported Springs*

Terrace Gravels (Tertiary)—north of the Milk River near Harlem are thin erosional remnants which have been covered and scoured by glaciers and mantled with till. Other gravel-terrace remnants are in the unglaciated area in the vicinity of the Bearpaw-Little Rocky Mountains uplift. The groundwater potential of these gravels is not yet known.

Flaxville Gravel (Tertiary)—is composed of fluvial sandy gravels, pebbles, and cobbles dating from near the end of Tertiary time. The "gravels" are 75 to 80 feet thick on the Big Flat. The upper part of this terrace deposit is infilled with glacial till over much of the Big Flat. At the base of the infilled zone locally is a ten-foot thick interval of hard cemented gravel which caps an effective aquifer 15 to 25 feet thick. Porosity of the aquifer is estimated to be 30% over an area of 150,000 acres. This aquifer probably contains about 900,000 acre-feet of good water and can be recharged by precipitation in the amount of 5,000 to 7,000 acre-feet annually. Some of the topographically higher gravels in the unglaciated area are age-equivalents of the Flaxville gravel of the Big Flat.

Volcanic Rocks and Intrusives (Tertiary)—are present in the mountainous areas and are not normally aquifers, although fractures in volcanic rocks can be water-bearing if they are below the water table or if another source of recharge exists.

Wasatch-Fort Union (Tertiary)—sandstones and shales are reported to occur in the Bearpaw Mountains as very small patches of faulted erosional remnants. It is doubtful that these remnants could supply even a small sustained yield of water.

Lance-Fox Hills (Cretaceous)—in the Hogeland basin in northeastern Blaine County is a sequence of sandstone and shales 200-300 feet thick which marks the end of Cretaceous deposition. Sandstones within this sequence are aquifers. Exposures are present but generally these strata are covered by the Flaxville gravels or glacial till. Distribution of this sequence is limited to northeastern Blaine County with perhaps a covered remnant in the Bearpaw Mountains.

Bearpaw Shale (Cretaceous)—is an interval of blue-black shale up to 1,000+ feet thick and not normally an aquifer.

Judith River Formation (Cretaceous)—is four hundred feet or more of interbedded sandstones, clays and shales, and coal seams. The sandstones are gray and fine-grained, each from three to forty feet thick, with an average porosity of 15-20%; permeability is poor. These sand bodies are lenticular and discontinuous and more massive in the basal part of the formation. Many wells in the County take water from the Judith River formation. From one to five water sands are tapped in each well. A gross interval of 150 feet may contain 75 feet of aquifer and produce only eight gpm (gallons per minute) pumping. At the other extreme, the Judith River can flow at least 80 gpm from one five-foot sand. The water is mineralized with total solids in excess of 2500 ppm (parts per million). Traces of natural gas have been reported in these sandstones.

Claggett Shale (Cretaceous)—is an interval of 500-700 feet of shale similar to the Bearpaw shale and not normally an aquifer.

Eagle Formation (Cretaceous)—underlying the Claggett, is an interval 250-275 feet thick of buff-colored silty sandstones and shales in the upper part and a massive sandstone 50-100 feet thick at the base. Very few water wells have been drilled into the Eagle. Several of these flowed small

amounts of water (3-6 gpm) from depths approaching 1,000 feet. Commercial amounts of natural gas are produced from this formation on the flanks of the Bearpaw Mountains at depths above 1,100 feet.

Colorado Shale (Cretaceous)—is 1,700+ feet of bluish-gray shale with thin sandstone lenses and stringers, none of which is considered an aquifer.

Kootenai Formation (Cretaceous)—is part of the Dakota-Lakota sequence, which is 200-400 feet of sandstones and shales containing some of the best artesian aquifers in Central Montana. Fifty million gallons of water bave been withdrawn from the Kootenai during a four and one-half year period and nsed in secondary oil recovery operations in the Bowes Field in T. 31-32N—R. 19-20E.

Ellis Interval (Jurassic)—is a group of limestones, sandstones, and shales which attain a collective thickness of over 400 feet; local potential aquifers may be present. Oil is produced commercially from the basal part in the Bowes Field.

Madison Limestone (Mississippian)—is one of the best undeveloped sources of water in the County, a thousand feet of light colored limestones sometimes having cavernous porosity in an upper massive unit. Large flows of almost unlimited quantities of water are reported in Central Montana. The source of the Big Warm Springs in T. 26N—R. 25E which reportedly have some potential for irrigation, is probably the Madison limestone. The Madison supplies industrial water in Blaine County for secondary recovery of oil in the Bowes Field. It is reported that approximately 100,000 gallons of water per day are pumped from the Madison at a depth of about 3,000 feet for this purpose.

Pre-Mississippian Aquifers—exist below the Madison in the 2,000+ feet of Devonian-Ordovician-Cambrian sediments. These formations have not been explored as sources of water due to availability of shallow water in better aquifers.

Pre-Cambrian—igneous and metamorphic rocks underlie the sedimentary section and can provide water from fractures but normally are not considered aquifers.

Groundwater Areas

There are six groundwater areas in Blaine County: (1) the Milk River flood plain, (2) the Big Flat, (3) the northern glaciated plain, (4) the southern glaciated plain, (5) the unglaciated area, and (6) the Missouri River Valley.

Milk River Flood Plain. Wells in the alluvium yield small amounts of highly mineralized water at depths of 10 to 140 feet below the surface. The concentration of total solids varies from 2,400 to 4,400 ppm. This water is generally unsuitable for domestic use and almost unsuitable for livestock use. The high mineral content is probably due to the widespread thick sequence of Bearpaw shale north of the Milk River and the inhibited percolation of water. Yields vary from less than one to forty gpm, 7-15 gpm being most common. Numerous wells in the flood plain have been drilled through the alluvium into the underlying Judith River formation. Yields from Judith River sandstones are 3-20 gpm and total solids measure 1,500-2,500 ppm.

Big Flat. The Flaxville gravel is the source of good water from depths of 20-80 feet below ground level. Several 36-inch holes cased with 16-inch pipe were drilled as irrigation wells. Yields

of 500-1,250 gpm were obtained using turbine pumps. A sustained yield sufficient for large-area irrigation cannot be maintained due to the limited aquifer thickness and the recharge available. Partially ringing the Big Flat on the western end is a band of sandstones and shales in the Lance (Hell Creek)-Fox Hills sequence generally covered by Flaxville gravel or glacial moraine. Small yields are obtained from the sandstones at depths of 100 to 200+ feet below the surface. These aquifers have not been utilized and future use could prove them adequate for both domestic and stock use. Waters from the Flaxville gravel and the Lance-Fox Hills interval are the least mineralized of any in the County.

Northern Glaciated Plain. The most-used aquifer is the Judith River formation which yields small to moderate amounts of water from depths of 250 feet below the surface near the Milk River to 1,250 feet in the Coburg syncline. A complete section 400+ feet thick is present, overlain by the Bearpaw shale. North of the Big Flat, pumping yields up to 30 gpm are reported from depths of 10-150 feet below ground level in outwash and ice-margin gravels. These constitute important local aquifers.

Southern Glaciated Plain. Glacial till is thinner on the mountain flanks than on the plain north of the Milk River, and the Bearpaw shale is absent excepting for local patches. The Judith River formation thins southward such that only the lower half of the section is present on the northern edge of the Bearpaw arch. These factors account for Judith River sandstone aquifers at very shallow depths and make possible the use of Eagle-sandstone water from depths above 1,000 feet. The mineral content of waters in this area reportedly is less than that north of the river. Wells with small flowing yields from gravels have been drilled along Clear Creek, Bean Creek, and Snake Creek where they leave the Bearpaw Mountains.

Unglaciated Area. Bedrock aquifers are primarily in the Judith River formation and occasionally in the Eagle formation. Judith River aquifers are deeper here than north of the Bearpaw arch due to the trend of the Cow Creek syncline and the presence of overlying Bearpaw shale. Numerous springs issue from bedrock in the valleys and on the flanks of the mountains and are used for watering stock. Groundwater has been claimed for subirrigation on the eastern slope of the Bearpaw Mountains.

Rain-water and snow-melt enter the aquifers at the intake areas and move downdip until the conduits are washed out by erosion or a well bore, or terminated by other processes. Natural washouts result in springs or seeps. Most of the springs in this area are perennial; flows range from three to thirty gpm. Much larger springs are reported on the Fort Belknap Indian Reservation.

The groundwater potential of much of the unglaciated area is obscured due to the complex geology resulting from many shallow thrust faults.

Missouri River Valley. Only small patches of alluvium are present along the Missouri River. One well yields 40 gpm mineralized water from a depth of 75 feet. Water found above 50 feet is considered "bad" even for livestock.

Groundwater Movement

The general groundwater movement in the bedrock aquifers is to the north and northeast from the mountains toward the Hogeland basin. Groundwater also moves from the uplifted areas toward the Cow Creek syncline. Some groundwater seeps into the Milk River from Judith River sandstones that have been breached by river erosion.

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ECONOMIC MINERAL DEPOSITS

Geologic Situation

Blaine County is in the northern Great Plains physiographic province (generally described as the high plains of the Northwest). The western boundary crosses the approximate center of the Bearpaw Mountains, which with their outlying foothills form the largest upland area in the county. The southwest corner of the county includes a part of the smaller but more prominent Little Rocky Mountains uplift. Other intrusive uplifts form prominent buttes between, and north of, the Little Rockies and the Bearpaws.

Glacial debris of Pleistocene age covers most of the county and overlies the extensive Flaxville gravel deposits in the northeastern part. The bedrock consists mostly of Upper Cretaceous (Montana Group) rocks—Bearpaw Shale and the sandstone, siltstone and shale of the Judith River Formation. The uppermost Cretaceous Hell Creek and Fox Hills Formations underlie much of the Flaxville Gravel, and older strata are exposed in the Little Rocky and Bearpaw uplifts.

A notable area of complex high-angle faulting occurs south and southeast of the Bearpaw Mountains, where the strata dip southeast into the Blood Creek and Cow Creek synclines.

Metallic Minerals

A search of the literature indicates no significant production of metallic minerals from Blaine County. There are traces of mineralization near igneous rock intrusions in the Bearpaws and Little Rockies.

Nonmetallic Minerals

Bentonite.—Bentonite is the commercial name for a type of mineral matter that swells when wet and forms a gel when mixed with water and allowed to stand. Recently, bentonite has proved useful as a bonding agent in the pelletizing of taconite (iron) ores for blast furnace reduction to iron. Bentonite beds in the Bearpaw Shale of Blaine County are under consideration for use in the pelletizing process. Mining is not yet underway but exploration and development activities are currently extensive and future prospects for production seem good.

Sand and Gravel.—Sand and gravel are abundant, especially in the large deposits of Flaxville Gravel in the northeastern part of the county. Because of the sparse population and the predominantly agricultural economy of the county, however, this resource is little used.

Mineral Fuels

Oil and Gas.—Blaine County has been the site of considerable petroleum exploration activity, though much of the area is as yet undrilled. Only one oil and gas field (Bowes) is delineated within the county borders. The Box Elder gas field straddles the Blaine-Hill County boundary. Recently a gas discovery was reported four miles south of the Box Elder field in T. 31N—R. 17E.

The Bowes oil and gas field is about six miles south of Chinook. The gas-producing area covers about five square miles, and the oil-producing area, about one mile eastward, covers about three square miles. Gas was developed in 1926 when four wells were drilled. By 1935 nine wells were completed, and seven to thirty million cubic feetof gas per day was drawn from the Eagle Sandstone at depths of 653 to 1,078 feet. Oil was developed in 1949, and peak production was reached in 1953 when production was 1,025,261 barrels. In August, 1966, Bowes produced 47,280 cubic feet of gas and 15,865 barrels of oil.

The Box Elder gas field began production in 1935, when two wells were connected to the Bowes-Havre pipeline. However, the August, 1966, Statistical Bulletin of the Montana Oil and Gas Commission did not list Box Elder as a producing field.

Coal.—The Milk River coal field extends through the central part of the county. This field contains subbituminous coal in the upper part of the Judith River Formation. The coal bed is 2.5 to 6.7 feet thick, but much of the bed is impure and contains partings of bone and shale. Mining was formerly carried on at Chinook on the Great Northern Railroad. Prospects for early renewal of mining activity do not seem very favorable.

Ground Water

Small supplies of ground water can be obtained from the Judith River, Fox Hills, and Hell Creek Formations of Cretaceous age. Large supplies of good water are available from the Flaxville Gravel which underlies the Big Flat; the only source of recharge to that aquifer is precipitation, but estimates of 5,000 acre-feet of recharge to the Flaxville seems reasonable. Approximately 300,000 acre-feet of ground water is in storage, and depletion of the Flaxville aquifer (water yielding gravel) is not imminent under present patterns of water use.[1]

Ground water development is also possible from gravel deposits south and east of the Bearpaws, and at several places around the perimeter of the Little Rockies. Deeper drilling to the Eagle Sandstone north of the Missouri also affords possibilities.

The files of the Montana Bureau of Mines and Geology contain records of 490 water wells. These are classified by the Bureau as domestic, irrigation, stock, stock and domestic, and industrial wells.

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[1] Zimmerman, Everett A., 1960, Geology and ground water resources of Northern Blaine County, Montana, Montana Bureau of Mines and Geology, Bull. 19.

SOIL AND WATER CONSERVATION DISTRICTS

Blaine County contains 2,730,880 acres; 533,915 acres are federally owned, 610,538 acres are in the Fort Belknap Indian Reservation, 178,555 acres are state owned, and 1,407,872 acres are privately and county owned. At the present time, approximately 2,307,229 acres are grazing lands, both range and pasture; 341,688 acres are cropland, of which 53,575 are irrigated; 60,000 acres are in woodlands and 21,963 acres are situated in towns, roads, airports, etc.

The Blaine County Soil and Water Conservation District is governed by a board of five supervisors who are elected by the land occupiers of the district. Under state law, the supervisors have the authority to call upon local, state, and federal agencies to assist in carrying out a soil and water conservation program.

The Blaine County Soil and Water Conservation District works closely with the Soil Conservation Service, Agricultural Stabilization and Conservation Service, Bureau of Land Management, Bureau of Indian Affairs, Farmers Home Administration, State Forester, State Extension Service and State Fish and Game Department. It is only through the cooperation of these agencies that a balanced soil and water conservation program can be obtained in the county.

The Soil Conservation Service assists the district by furnishing and interpreting basic data on soils and plant cover and other features of the land. Technical data are interpreted in terms of acceptable alternative uses and treatments to help guide the farm and ranch operator in developing sound conservation plans. The SCS also aids district cooperators in performing operations requiring technical skills beyond the experience of the individuals involved.

Blaine County has numerous water supplies for irrigation. The major irrigated area is the Bureau of Reclamation Milk River Irrigation Project, Chinook Division, which consists of the Fort Belknap, Alfalfa Valley, Paradise Valley, Zurich, and the Harlem Irrigation Districts; two others in the county are the Fort Belknap Indian Irrigation Project and the North Chinook Irrigation Association.

Irrigation water is obtained from the Milk River, West Fork of the Milk River, North Fork of the Milk River, Clear Creek, Peoples Creek, Cow Creek, Mission Creek, Wood Coulee Creek, Section Creek, Wind Creek, Missouri River and 71 irrigation dams on various drainages.

Major crops grown in Blaine County are wheat, barley, rye, oats, corn, sugar beets and alfalfa. Major livestock is beef cattle and sheep. There are numerous dairy herds and some swine raised on small irrigated units.

Various agricultural conservation programs are in operation in the county. Four major programs are as follows: Agricultural Conservation Program, Great Plains Conservation Program, Conservation Reserve, Cropland Conversion Program and diversion acres of wheat and feed grain. All of these programs paid approximately $537,000 to local land owners and operators in the county during the 1965 fiscal year.

To better utilize water in Blaine County, 923 farm ponds and 4,949 acres of water-spreading have been constructed. In addition, 12,974 acres of land leveling, 261 miles of irrigation canals and 2,420 irrigation systems have been installed since the district was formed.

The biggest problem in the county is its soil; high water tables during the irrigation season and high concentration of salts limit production and alternative uses.

Blaine County lies within two rainfall belts. Areas located in the Bearpaw and Little Rocky Mountains fall in the 15″ to 19″ rainfall belt; portions of the county lying north and south of these mountains are in the 10″ to 14″ belt.

It is interesting to note that over 80% of the conservation practices completed in Blaine County during the 1965 fiscal year were completed by Blaine County Soil and Water Conservation District cooperators, even though they number only 63% of the land owners and operators in the county.

FISH AND GAME

Fish

Blaine County has numerous farm ponds capable of sustaining excellent fish populations and providing considerable angling opportunities. Those reservoirs constructed in the foothills of the Bearpaw Mountains are particularly adapted to supporting fish life since the steeper terrain provides dam sites for many small but relatively deep reservoirs. Reservoirs in north Blaine County also provide some good trout fishing ponds; however, these are usually more shallow and subject to frequent winter kill. Blaine County reservoirs are stocked with trout primarily but a few ponds have had warm-water fish such as bass, crappie and bluegill introduced into them. The trout are by far the most successful fish stocked. In addition to the pond fishing, the streams originating in the Bearpaw Mountains and flowing through Blaine County have excellent self-sustaining populations of brook and rainbow trout.

Game

Blaine County contains some of the finest game habitat in eastern Montana. In the northern portion of the county, many thousands of ducks and geese are produced each year, particularly on North Chinook Reservoir and other smaller impoundments. This is also the home of the antelope and prairie grouse and, where grain is grown, the Hungarian partridge. The introduced Chinese pheasant can be found on the bottomlands of the Milk River and its tributaries.

Further south, the Bearpaw Mountains afford game habitat of a different sort—habitat for mule deer and whitetailed deer as well as sharptailed grouse in the foothills.

More remote from population centers is the Missouri River Breaks, and here we find mule deer inhabiting some extremely rough country.

Annual sales of big game and bird licenses in the county run around $2,000, showing the importance of the game resource to local outdoor recreation. With careful management and barring any major change in land use practices, this contribution can certainly be sustained for future generations.

SUMMARY OF IRRIGATED LAND BY RIVER BASINS IN THE FOLLOWING COUNTIES COMPLETED TO DATE

Big Horn, **Blaine**, Broadwater, Carbon, Carter, Cascade, Choteau, Custer, Deer Lodge, Fallon, Flathead, Gallatin, Golden Valley, Granite, **Hill**, Jefferson, Judith Basin, Lake, Lewis & Clark, Lincoln, Madison, Meagher, Missoula, Musselshell, Park, Pondera, Powder River, Powell, Ravalli, Rosebud, Silver Bow, Stillwater, Sweet Grass, Teton, Treasure, Wheatland, Wibaux, and Yellowstone.

RIVER BASIN	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
Missouri Drainage Basin			
*Missouri River	109,660.50	25,290.33	134,950.83
Jefferson River	61,291.00	9,713.00	71,004.00
Beaverhead River	40,771.00	6,076.00	46,847.00
Big Hole River	23,775.00	1,950.00	25,725.00
Madison River	39,445.00	7,660.00	47,105.00
Gallatin River	112,054.00	21,242.00	133,296.00
Smith River	32,934.00	19,679.00	52,613.00
Sun River	124,474.58	4,385.00	128,859.58
Marias River	114,685.42	13,415.88	128,101.30
Teton River	74,653.00	15,882.33	90,535.33
Musselshell River	64,789.00	57,870.00	122,659.00
Milk River	69,998.00	17,807.33	87,805.33
Yellowstone River**	303,657.00	96,016.00	399,673.00
Stillwater River**	30,423.50	8,028.53	38,452.03
Clarks Fork River**	88,160.97	1,530.83	89,691.80
Big Horn River**	65,005.00	23,858.00	88,863.00
Tongue River	28,170.00	7,762.00	35,932.00
Powder River	35,948.00	2,299.00	38,247.00
Little Missouri River	42,513.00	1,499.00	44,012.00
Grand Total Missouri River Basin	**1,462,407.97**	**341,964.23**	**1,804,372.20**
Columbia River Drainage Basin			
Columbia River	0	0	0
Kootenai (Kootenay) River	9,914.13	968.00	10,882.13
Clark Fork (Deer Lodge) (Hellgate) (Missoula) River	146,287.70	14,934.20	161,221.90
Bitterroot River	111,102.43	3,200.00	114,302.43
Flathead River	135,907.19	4,532.22	140,439.41
Grand Total Columbia River Basin	**403,211.45**	**23,634.42**	**426,845.87**
GRAND TOTAL IN COUNTIES COMPLETED TO DATE	**1,865,619.42**	**365,598.65**	**2,231,218.07**

*Names of streams indented on the left-hand margin indicate that they are tributaries of the first stream named above which is not indented.

**Figures in these River Basins revised by resurvey of Carbon County, 1965.

IRRIGATION SUMMARY OF BLAINE COUNTY BY RIVER BASINS

MISSOURI RIVER BASIN	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
*Missouri River	183	37	220
Black Coulee	0	0	0
West Fork Black Coulee	92	0	92
Cow Creek	405	260	665
Hedges Creek	0	0	0
West Fork Hedges Creek	0	0	0
Sols Creek	86	10	96
Gap Creek	82	36	118
North Fork Gap Creek	49	0	49
Gold Creek	96	10	106
West Fork Gap Creek	185	14	199
Winters Creek	50	29	79
Hensen Creek	261	0	261
Sand Creek	0	0	0
Dogtown Creek	73	0	73
Suction Creek	405	52	457
North Branch Suction Creek	52	0	52
Unnamed Coulee	23	0	23
Logan Creek	81	18	99
Cromley Coulee	40	0	40
Thomlinson Coulee	10	0	10
Big Coulee (Rock Creek)	84	0	84
Rattlesnake Creek (Alkali Coulee)	0	37	37
Tin Horn Coulee	64	0	64
Total Cow Creek and Tributaries	**2,046**	**466**	**2,512**
Milk River	49,812	4,688	54,500
Davey Coulee	35	10	45
Gopher (Skeleton) Coulee	0	0	0
Duck Pond Reservoir	0	24	24
Clear Creek	2,046	413	2,459
Basin Creek	271	0	271
Wind Creek	38	0	38
Waste Water	50	0	50
Slough	18	0	18
Red Rock Coulee	158	64	222
Hawkinson Coulee	100	8	108
Three Mile Coulee	0	0	0
Black Coulee	0	22	22
South Fork Black Coulee	28	0	28
Bennette Coulee	0	14	14
Lodge Creek (West Fork Milk River) (West Fork Creek)	1,550	430	1,980
Unnamed Coulee	0	702	702
Holmes Coulee	40	20	60
Hay Coulee	206	0	206
Schmid Coulee	0	0	0
West Fork Schmid Coulee	60	0	60
Thibedeau Coulee	28	0	28
Total Lodge Creek and Tributaries	**1,884**	**1,152**	**3,036**
Six Mile Coulee	216	5	221
Battle Creek (North Fork Milk River)	1,269	148	1,417
Corregan Coulee	0	140	140
East Fork Battle Creek	0	0	0
Unnamed Coulees	144	0	144

*Name of streams indented on the left-hand margin indicate that they are tributaries of the first stream named above which is not indented.

IRRIGATION SUMMARY OF BLAINE COUNTY BY RIVER BASINS

MISSOURI RIVER BASIN	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
Bennett Coulee	171	30	201
Scotchman Coulee	98	0	98
Burrell Coulee	97	10	107
Choteau Coulee	121	534	655
North Fork Choteau Coulee	0	79	79
Unnamed Coulee	85	0	85
Unnamed Coulee	85	0	85
Dry Fork	150	14	164
Total Battle Creek and Tributaries	**2,220**	**955**	**3,175**
Nine Mile (Lonetree) (Blackstone) Coulee	18	0	18
Slough (Dead River)	44	21	65
Waste Water	36	0	36
Drain Ditch	65	0	65
Reservoir (Birdwell) Coulee	24	0	24
Unnamed Coulee	37	0	37
Fifteen Mile Coulee	513	119	632
Stanley Creek	35	0	35
Murphy Coulee	188	0	188
Nessler Creek	0	16	16
Coulee	0	20	20
Snake Creek	1,211	478	1,689
Little Snake Creek	131	56	187
Sulphur Butte Creek	20	0	20
Spring Creek (Cold Spring Coulee)	20	32	52
Gold Creek	28	77	105
Timber Creek	46	0	46
Jessen Coulee	0	35	35
Ganty Creek	133	0	133
Muir Creek	73	0	73
Spring Creek	31	0	31
Drewniak Coulee	4	9	13
Bean Creek	1,147	220	1,367
Little Bean (Miller) Creek	0	12	12
East Fork Bean Creek (South Fork) (Dickson Coulee)	41	17	58
Canati Coulee	0	57	57
Unnamed Coulee	43	0	43
Box Elder Coulee	250	285	535
Ross Coulee	0	114	114
Olson (Lopez) Coulee	0	93	93
Branch of Box Elder	0	35	35
Martin Luke (Black) Coulee	93	0	93
Total Snake Creek and Tributaries	**3,271**	**1,520**	**4,791**
Waste Water	12	0	12
Coal Coulee	40	0	40
Parallel (Thirty Mile) Coulee	212	22	234
West Fork Parallel Creek	0	130	130
Trib. West Fork Parallel Creek	0	219	219
Drain Ditch	20	0	20
Oleson Coulee	0	55	55
Waste Water	0	155	155
Unnamed Coulee	0	90	90
Wayne Creek	280	343	623
Unnamed Coulee	25	0	25
Bad Land Coulee	0	20	20
Savoy Creek	792	1,232	2,024
East Savoy Creek	0	0	0
Unnamed Coulee	195	0	195

IRRIGATION SUMMARY OF BLAINE COUNTY BY RIVER BASINS

MISSOURI RIVER BASIN	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
Lone Tree Coulee	30	0	30
Unnamed Coulee	11	56	67
Unnamed Coulee	41	77	118
King Coulee	39	80	119
Unnamed Coulee	27	0	27
Unnamed Coulee	0	35	35
Milk Creek	0	0	0
Eureka Creek	390	60	450
Unnamed Coulee	0	40	40
Peoples Creek	828	1,100	1,928
Trib. Peoples Creek	21	0	21
Willow Creek	31	1	32
South West Trib. Peoples Creek	87	73	160
Kuhr Creek	15	71	86
Revey Creek	79	9	88
Timber Creek	32	0	32
Crown Butte Creek	112	0	112
Nicholson (Bluff) Creek	72	2	74
Kuhr Coulee	0	124	124
Trout (Spring) (Maggies) Creek	0	130	130
Surprise Spring Creek	0	0	0
Olson Coulee	0	52	52
Unnamed Coulee	13	47	60
South Fork Peoples Creek	404	475	879
Little Peoples Creek	1,359	280	1,639
Duck Creek	15	0	15
Jim Brown Creek	56	0	56
Lodge Pole Creek	169	0	169
Total Peoples Creek and Tributaries	**3,293**	**2,364**	**5,657**
Cottonwood Creek	0	0	0
Woody Island Creek	173	560	733
Murphy Coulee	155	0	155
Unnamed Coulee	0	102	102
Buckley Coulee	590	310	900
Run-off	10	0	10
Little Jewel (Black) Coulee	0	0	0
West Branch Black Coulee (Little Jewel) (Duck Lake Coulee)	0	138	138
Beaver Creek	0	0	0
Big Warm Springs Creek	222	73	295
Total Milk River and Tributaries	**67,664**	**15,212**	**82,876**
GRAND TOTAL BLAINE COUNTY	**69,985**	**15,715**	**85,700**

FORT BELKNAP IRRIGATION PROJECT

(Fort Belknap Indian Reservation)

HISTORY

The Fort Belknap Indian Reservation is located in Blaine and Phillips Counties in north central Montana. The reservation is rectangular in shape and covers an area of about forty miles in length from the Milk River (north boundary) to the Little Rocky Mountains in the south. In width the reservation extends for a distance of about twenty-five miles with three-fourths of its total area lying within Blaine County. Fort Belknap Agency headquarters are located in the northwestern part of the reservation on U. S. Highway #2, five miles southeast of the town of Harlem.

The first irrigation used on the Fort Belknap Indian Reservation was in the year 1893 when a small ditch was constructed from the right bank of the Milk River near the site of the present agency headquarters.

March 27, 1894 a survey was started to determine the irrigable lands on the reservation and included the Milk River, Peoples Creek, Lodge Pole Creek, and the Snake Creek systems.

The next work of any importance in the development of irrigation was started in 1898 with additional expenditures for the Milk River and the Big Warm Creek Irrigation systems. Work continued on these projects for the next four years until 1902 at which time the Big Warm system was completed. In 1903 work continued on the Milk River system and the Three-Mile Reservoir was constructed.

Irrigation systems that are presently in operation on the Fort Belknap Reservation include the Milk River Unit, Three-Mile Unit, White Bear Unit, Peoples Creek (Hays) Unit, Brown Unit, and numerous private ditch systems.

Sources of water supply for irrigation on the reservation are the Milk River and its tributaries which include Snake Creek, White Bear Creek, Peoples Creek and its tributaries consisting of Lodge Pole Creek and Little Rocky Mountain branch of Peoples Creek.

PRESENT STATISTICS

Location: The location of lands irrigated by the irrigation systems on the Fort Belknap Indian Reservation are as follows:

Milk River Unit—Sections 33, 34, and 35, T. 32N—R. 23E; Sections 1-4 inclusive and Section 12, T. 31N—R. 23E; Sections 1-18 inclusive, 23, and 24, T. 31N—R. 24E; Sections 17-21 inclusive, 27, and 28, T. 31N—R. 25E. Point of diversion of the Milk River Unit "A" Canal is the NW¼ SE¼ of Section 32, T. 32N—R. 23E.

Three-Mile Unit—Sections 15, 16, 17, 21, 22, and 23, T. 31N—R. 24E. Point of diversion of the Three-Mile Unit "B" Canal is in the SE¼SE¼ of Section 17, T. 31N—R. 24E.

White Bear Unit—Sections 24-27 inclusive and 36, T. 31N—R. 25E. Point of diversion for the White Bear Unit "C" Canal is in the SW¼SW¼ of Section 28, T. 31N—R. 25E.

Peoples Creek (Hays) Unit—Sections 1, 2, 12, 13, 14, 23, 24, and 25, T. 26N—R. 23E; Sections 19, 20, 29, 30, 31, and 32, T. 26N—R. 24E. (For this unit, see map in Part II, page 2 for points of diversion of ditch system.)

Brown Unit—Sections 25, 34, 35, and 36, T. 28N—R. 23E; Sections 29 and 32, T. 28N—R. 24E. Point of diversion of the main canal for this unit is in the SW¼SE¼ of Section 33, T. 28N—R. 23E.

Private Ditches—Sections 12, 13, and 24, T. 26N—R. 25E (Big Warm Spring Creek); Sections 13, 14, and 24, T. 27N—R. 23E (McGuire Lease). (See maps in Part II for points of diversion for these ditch systems.)

Lengths and Capacities of Canals: Milk River Unit "A" Canal was originally designed to carry an initial capacity of 180 cfs. and has an over-all length of 16.5 miles.

Three-Mile Unit "B" Canal is approximately three miles in length and has a capacity of 25 cfs. This canal diverts below the Three-Mile Reservoir which has a storage capacity of 1,430 acre-feet and covers a surface area of about 120 acres. Additional water is pumped into the Three-Mile Reservoir from the Milk River Unit "A" Canal.

White Bear Unit "C" Canal has an initial capacity of 70 cfs. and a length of about 4 miles in Blaine County. This canal extends into Phillips County for irrigation of reservation land in that area.

Brown Unit Canal is 8.5 miles in length and has a capacity of 15 cfs.

Peoples Creek (Hays) Unit is mostly small individual ditch systems that divert directly from the stream.

In addition, there are numerous other private ditches on the reservation.

Operation and Maintenance: On the Fort Belknap Indian Reservation operation and maintenance charges are included in the total water charge assessed for each acre of irrigated land. These water charges are as follows:

Milk River Unit—$2.65 per acre for Indian-owned land and $3.88 per acre for non-Indian land.

Three-Mile Unit—$3.20 per acre for Indian-owned land and $4.43 per acre for non-Indian land.

White Bear Unit—$2.65 per acre for Indian-owned land and $3.88 per acre for non-Indian land.

Peoples Creek (Hays) and Brown Units—$2.00 per acre for both Indian-owned land and non-Indian land.

Present Users: The number of water users listed under the Fort Belknap Indian Reservation irrigation systems in 1966 are as follows: Milk River unit, 304; Peoples Creek (Hays) Unit, 86; Three-Mile Unit, 39; White Bear Unit, 51; and Brown Unit, 16. In addition, a total of 26 water users operate and own private ditch systems on the reservation in Blaine County.

Acreage Irrigated: In 1966 the Water Resources Survey found the following acres irrigated and potentially irrigable under the irrigation systems on the Fort Belknap Indian Reservation.

Milk River Unit—7,261 acres irrigated, 751 acres potentially irrigable.

Three-Mile Unit—810 acres irrigated, 112 acres potentially irrigable.

White Bear Unit—1,107 acres irrigated, 216 acres potentially irrigable.

Peoples Creek (Hays) Unit—1,151 acres irrigated, 258 acres potentially irrigable.

Brown Unit—404 acres irrigated, 475 acres potentially irrigable.

Private Systems—1,080 acres irrigated, 540 acres potentially irrigable.

The total of all irrigation on the Fort Belknap Indian Reservation is 11,813 acres irrigated and 2,352 acres potentially irrigable under existing ditch facilities with a maximum of 14,165 acres.

WATER RIGHT DATA

Water rights appurtenant to the Fort Belknap Indian Reservation are:

Decreed to the Fort Belknap Indian Reservation the first right of 5,000 miner's inches or 125 cfs. of the waters of the Milk River and its tributaries. (Reference: Case #747, Circuit Court of the U.S.A., Ninth Circuit, William A. Hunt, Judge, Helena, Montana, dated 4-21-1906, filed in Federal Records Center, G.S.A., 6125 Sandpoint Way, Seattle, Washington.) The Fort Belknap Indian Reservation is entitled by an agreement with the Bureau of Reclamation to one-seventh interest in the available storage in the Fresno Reservoir. The available annual storage capacity in the Fresno Reservoir is 127,200 acre-feet; one-seventh interest of this annual storage will be 15,310 acre-feet.

(See maps in Part II; Milk River Unit, pages 29, 30, 31, and 38; Three-Mile Unit, page 30; White Bear Unit, page 31; Peoples Creek, page 2; and Brown Unit, pages 14 and 15.)

MATHESON DITCH COMPANY

HISTORY

The Matheson Ditch Company was first incorporated on April 1, 1899 for a term of 20 years. Reincorporation Articles were filed April 1, 1919 for a period of forty years and again on June 28, 1952. The last incorporation in 1952 was for a period of continual existence. The amount of capital stock listed for the corporation was $5,000 divided into 200 shares with a par value of $25 each. Among the first organizers and members of the company were John Matheson, Thomas Dowen, Chas. G. Acher, and H. M. Burrus. The water supply for this irrigation project is by a direct ditch diversion from the Milk River.

PRESENT STATISTICS

Location: Land irrigated by the Matheson Ditch Company is located in Sections 27, 28, 33, and 34, T. 33N—R. 20E. The point of diversion of the Matheson Ditch is in the SE¼NW¼ of Section 29, T. 33N—R. 20E.

Length and Capacity of Canal: The main canal has a capacity of approximately 20 cfs. and a length of 2½ miles.

Operation and Maintenance: Under the Matheson Ditch Company there are no regular assessments for operation and maintenance. The water users share expenses for the repairs and upkeep of the ditch system.

Present Users: During the year of 1966 there were four water users (stockholders) in the Matheson Ditch Company. Each of the four stockholders own 25 shares of company stock; one share of stock is equal to 50 miner's inches of water.

Acreage Irrigated: As of the date of our Water Resources Survey in 1966, there were 473 acres irrigated and no acres potentially irrigable under the Matheson Ditch.

WATER RIGHT DATA

The water right that applies to the Matheson Ditch Company was filed by John W. Clark, et al, from the North Fork of the Milk River (Battle Creek) dated August 19, 1895 for 5,000 miner's inches. (Reference: Book 1, Water Right Records, Page 382, Clerk & Recorder's Office, Blaine County.)

(See maps in Part II, page 42).

NORTH CHINOOK IRRIGATION ASSOCIATION

HISTORY

This irrigation association was first formed on April 28, 1905 for a period of 20 years. Original directors of the association were R. F. Hansen, C. H. Potter, and R. B. Snedecor. Re-incorporation Articles were filed on December 31, 1936 extending the association's corporate existence for a 40-year period. Capital stock of the corporation totaled $40,000 with 4,000 shares issued at a par value of $10.00 per share. The number of presently subscribed shares total 940.

Project features of the irrigation system include a storage reservoir, an intake canal, and a distribution canal which diverts from the reservoir for the irrigation of land below it. The source of water supply for storage in the North Chinook Reservoir is from Lodge Creek. This stream is also known as the West Fork of the Milk River.

PRESENT STATISTICS

Location: The North Chinook Irrigation Project is located in the northwest part of Blaine County. Lands irrigated under the irrigation system are located in Section 26, T. 35N—R. 18E; Sections 30 and 31, T. 35N—R. 19E; Sections 1, 11, 12, and 13, T. 34N—R. 18E; Sections 6, 7, 8, 17-21 inclusive, 28, 29, 33, and 34, T. 34N—R. 19E; Sections 3 and 10, T. 33N—R. 19E. Point of diversion of the main canal is in the NE¼NE¼ of Section 26, T. 35N—R. 18E.

Length and Capacity of Canal: From its point of diversion the North Chinook Irrigation Association main canal is 13 miles in length and has an initial capacity of about 40 cfs. The usable storage capacity of the North Chinook Reservoir is 1,175 acre-feet and covers a surface area of 1,718 acres. One share of stock is equivalent to 50 miner's inches of water when the reservoir is filled to its full capacity. The amount of water allocated to each share of stock may vary as the amount is determined by the available supply stored in the reservoir.

Operation and Maintenance: Under this irrigation project, operation and maintenance charges are $1.00 per year for each share of stock owned in the association.

Present Users: There is a total of 13 members that own 940 stock shares in the association.

Acreage Irrigated: In 1966 under the North Chinook Irrigation Association, there were 1,486 acres irrigated and 430 acres potentially irrigable with a maximum of 1,916 acres under the system.

WATER RIGHT DATA

The following water rights are appurtenant to the North Chinook Irrigation Association:

An appropriation by the North Chinook Irrigation Association from the West Fork of the Milk River (Lodge Creek) dated September 15, 1908 for 3,000 miner's inches. (Reference: Book 2, Water Right Records, Page 429, Clerk & Recorder's Office, Blaine County.)

An appropriation by E. W. Gibbs, et al, from the West Fork of the Milk River (Lodge Creek) dated August 28, 1905 for 125 cfs. or 5,000 miner's inches. (Reference: Book 7, Deed Records, Page 104, Clerk & Recorder's Office, Blaine County.)

(See maps in Part II, Pages 34, 46, 47, 49, and 50.)

MILK RIVER PROJECT, CHINOOK DIVISION (U. S. BUREAU OF RECLAMATION)

HISTORY

Irrigation of land in the Milk River Valley was first initiated by white settlers who built small, private, individual irrigation systems. The first water right filed on the Milk River was in 1889 by T. B. Burns, who in 1890 joined with his neighbors in constructing a community diversion dam in the vicinity of the present Fort Belknap Diversion Dam. In 1891 investigations were started to determine the means of supplementing the low summer flow of the Milk River. It was found that the most feasible plan was the diversion of St. Mary River water into the head waters (North Fork) of the Milk River. Both of these rivers, however, ran through Canada, which necessitated a water-rights agreement with Canada before the plan could be consummated.

Increasing irrigation activities in the Milk River Valley brought urgent requests for the development of a Milk River Project. When the Reclamation Service was established in 1902, the Milk River Project was investigated and this resulted in authorization of the project by the Secretary of the Interior on March 14, 1903.

The St. Mary Storage Unit was authorized by the Secretary of the Interior on March 25, 1905 and construction began on July 27, 1906. The treaty with Great Britain relating to the distribution between Canada and the United States of the waters of the St. Mary and Milk Rivers was signed on January 11, 1909. The Dodson Diversion Dam was completed in January of 1910 and the first water delivered for irrigation in the season of 1911.

Sherburne Lake, Nelson, St. Mary, and Swift Current Dams were completed in 1915, Vandalia Dam in 1921, and Fresno Dam in 1939. Fresno Dam and Reservoir, formerly called Chain Lakes Dam and Reservoir, was constructed under the National Industrial Recovery Act and approved by the President in August, 1935 pursuant to the acts of June 25, 1910 and December 5, 1924.

The Dodson Pumping Unit was approved by the President on March 17, 1944 and under the Water Conservation and Utilization Act of August 11, 1939, the project was constructed to furnish water for about 1,655 acres of land above the gravity system.

The Milk River Project located in Blaine, Glacier, Phillips, and Valley Counties, Montana, provides for storage of St. Mary water in Sherburne Lake and its diversion through a 29-mile canal discharging into the North Fork of the Milk River. It then flows through Canada for 216 miles before returning to the United States. Milk River water is stored in Fresno Reservoir located 17 miles west of Havre, Montana, and in Nelson Reservoir, located 19 miles northeast of Malta. The water is diverted from the Milk River near Chinook and Harlem into the canals on each side of the river and land in that area comprising the Chinook Division. Near Dodson, canals divert water for irrigating land in the vicinity of Dodson, Wagner, Malta, and Bowdoin. The Dodson South canal conveys water for irrigation of land on the Malta Division south of the Milk River and also conveys water for storage in the Nelson Reservoir. From this storage, land is irrigated on the south side of the Milk River and Beaver Creek near Saco and Hinsdale. The Vandalia Dam, a canal from the south side of the Milk River, carries water for the irrigation of land near Tampico, Glasgow, and Nashua comprising the Glasgow Division. Land is also irrigated by pumping above the level of the gravity system along the Milk River Valley. This is accomplished by the Dodson Pumping Unit which elevates water from the Dodson North canal to irrigate additional lands above the gravity system.

The operation of all storage facilities is by the Bureau of Reclamation with funds advanced by the water users.

Chinook Division

Except for storage facilities, all water supply and distribution works were constructed and are operated and maintained by five irrigation districts comprising the Chinook Division. These irrigation districts are as follows: Fort Belknap, Alfalfa Valley, Zurich, Harlem, and Paradise Valley Irrigation Districts. Water is diverted near Lohman for Fort Belknap, Alfalfa Valley, and Zurich irrigation Districts, and southeast of Chinook for the Paradise Valley Irrigation District. Two pumping plants furnish water for the Harlem Irrigation District.

PRESENT STATISTICS

Location: Lands irrigated under the five irrigation districts are as follows:

Fort Belknap Irrigation District—Lands are located in Sections 10, 11, 13, 14, 15, 16, and 21-27 inclusive, T. 33N—R. 18E; Sections 18-22 inclusive, 25-30 inclusive, and 33-36 inclusive, T. 33N—R. 19E. The point of diversion is the left bank of the Milk River, NE¼SE¼ of Section 20, T. 33N—R. 18E. This canal also furnishes water for the Alfalfa Valley and Zurich Irrigation Districts.

Alfalfa Valley Irrigation District—Lands are located in Sections 15, 21-26 inclusive, and 36, T. 33N—R. 19E; Sections 19, and 27-32 inclusive, T. 33N—R. 20E; Section 5, T. 32N—R. 20E.

Zurich Irrigation District—Lands are located in Sections 2-6 inclusive and 9-13 inclusive, T. 32N—R. 22E; Sections 7, 8, and 15-22 inclusive, T. 32N—R. 23E; Sections 19, 20, 25-30 inclusive, 35, and 36, T. 33N—R. 20E; Sections 28-36 inclusive, T. 33N—R. 21E; Section 31, T. 33N—R. 22E; Sections 1, 2, and 12, T. 32N—R. 21E.

Paradise Valley Irrigation District—Lands are located in Sections 30 and 32-36 inclusive, T. 33N—R. 20E; Sections 31, 32, and 33, T. 33N—R. 21E; Sections 1-4 inclusive, 10, and 11, T. 32N—R. 20E; Sections 2-15 inclusive, T. 32N—R. 21E; Sections 7, 8, 9, 17, 18, and 20, T. 32N—R. 22E. Point of diversion is the right bank of the Milk River in the SE¼NW¼ of Section 6, T. 32N—R. 20E.

Harlem Pumping Plant #1 and Canal—Lands are located in Section 33, T. 33N—R. 21E; Section 5-11 inclusive, 14, 15, and 22-26 inclusive, T. 32N—R. 22E; Sections 19-33 inclusive, T. 32N—R. 23E; Section 30, T. 32N—R. 24E. Point of diversion is the bank of the Milk River in the NW¼SW¼ of Section 33, T. 33N—R. 21E.

Harlem Pumping Plant #2 and Canal—Lands are located in Sections 25-28 inclusive and 32-36 inclusive, T. 32N—R. 23E; Sections 29-32 inclusive, T. 32N—R. 24E; Section 1, T. 31N—R. 23E; Section 6, T. 31N—R. 24E. Point of diversion is the Milk River bank in the SE¼NW¼ of Section 32, T. 32N—R. 23E.

Lengths and Capacities of Canals: Fort Belknap Canal has an initial capacity of 400 cfs. and a total length of 8 miles. This canal serves the Fort Belknap, Alfalfa Valley, and Zurich Irrigation Districts.

Paradise Valley Canal is 17¾ miles long and has an initial capacity of 200 cfs.

Harlem Pumping Plant #1 Canal is 15½ miles long and has a capacity of 200 cfs. The pumping plant consists of four pumps—one 20″ pump with 20 cfs., two 30″ pumps of 40 cfs. each, and one 36″ pump with 80 cfs. for a total of 180 cfs.

Harlem Pumping Plant #2 Canal has a capacity of 50 cfs. and is 7¾ miles in length. This pumping plant has two 18″ pumps with 16 cfs. each for a total of 32 cfs.

Size and Capacity of Reservoirs: Sherburne Lake active storage between elevations 4,726′ and and 4,788′ is 66,100 acre-feet and covers a surface area of 1,730 acres.

Fresno Dam active storage between elevations 2,530′ and 2,575′ has a capacity of 127,200 acre-feet and covers a surface area of 5,800 acres.

Carriage Facilities—Length and Capacity: St. Mary canal from the St. Mary Diversion Dam to the North Fork of the Milk River has a length of 29 miles and a capacity of 850 cfs.

Operation and Maintenance: The following are the 1965 assessments levied for the five irrigation districts in the Chinook Division of the Milk River Project:

Fort Belknap—General fund, 95¢; Fresno construction, 30¢; St. Mary construction, 25¢; St. Mary operation and maintenance, 10¢; District operation and maintenance, $1.60; Bond, 25¢; Drainage fund, 20¢; Total water charge per irrigated acre, $3.65.

Alfalfa Valley—General fund, 45¢; Fresno construction, 80¢; St. Mary Construction, 30¢; St. Mary operation and maintenance, $1.50; District operation and maintenance, 55¢; Total water charge per irrigated area, $3.60.

Zurich—General fund, $2.40; Fresno construction, 70¢; St. Mary construction, 40¢; Total water charge per irrigated acre, $3.50.

Paradise Valley—General fund, $1.65; Fresno construction, $1.00; St. Mary construction, 40¢; St. Mary operation and maintenance, 55¢; Flume fund, 35¢; District operation and maintenance, 35¢; Total water charge per irrigated acre, $4.30.

Harlem—St. Mary and Fresno payment, $1.00; St. Mary operation and maintenance, 30¢; District operation and maintenance, $2.00; Bond, 20¢; Total water charge per irrigated acre, $3.50.

Present Users: As of the date of the water resources survey of 1965, there were 76 water users in the Fort Belknap Irrigation District; 25 water users in the Alfalfa Valley Irrigation District; 71 water users in the Zurich Irrigation District; 59 water users in the Paradise Valley Irrigation District; and 54 water users in the Harlem Irrigation District.

Acreage Irrigated: Listed below are the 1965 figures for irrigated and potentially irrigable land under present facilities for the five irrigation districts of the Chinook Division.

Fort Belknap Irrigation District—6,393 acres irrigated, 432 acres potentially irrigable.

Alfalfa Valley Irrigation District—3,072 acres irrigated, 92 acres potentially irrigable.

Zurich Irrigation District—7,732 acres irrigated, 937 acres potentially irrigable.

Paradise Valley Irrigation District—8,324 acres irrigated, 309 acres potentially irrigable.

Harlem Irrigation District—10,047 acres irrigated, 790 acres potentially irrigable.

For the entire Chinook Division there is a total of 35,568 acres irrigated and 2,560 acres potentially irrigable.

The Bureau of Reclamation has pumping contracts with private water users along the Milk River that are not included in irrigation districts. There is a total of 4,293 acres irrigated and 474 acres potentially irrigable by these private pumping contracts.

WATER RIGHT DATA

The water rights that apply to the Chinook Division of the Milk River project were filed and appropriated by the United States of America and are as follows:

1. An appropriation by the U.S.A. from the St. Mary River dated 5-25-1918 for 25,000 cfs. (Reference: Book A, Water Rights Records, page 282.)

2. An appropriation by the U.S.A. from the St. Mary Reservoir dated 9-29-1921 for 25,000 cfs. (Reference: Book I, Water Rigbts Records, page 72.)

3. An appropriation by the U.S.A. from the Swift Current Creek dated 5-29-1912 for 7,500 cfs. (Reference: Book A, Water Rights Records, page 61.)

All of the above water right filings are located in the Clerk & Recorder's Office, Glacier County, Montana.

(See maps in Part II, Alfalfa Valley Irrigation District, pages 34, 35, and 42; Fort Belknap Irrigation District, pages 34 and 41; Zurich Irrigation District, pages 36, 37, 38, 42, 43, and 44; Paradise Valley Irrigation District, pages 35, 36, 37, 42, and 43; Harlem Irrigation District, pages 29, 30, 37, 38, 39, and 43.)

WATER RIGHT DATA—BLAINE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAM	APPROPRIATIONS (Filings of Records) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
MISSOURI RIVER BASIN							
Missouri River	0	0	0				
***Birch Creek**	0	0	0				
East Branch Birch Creek	1	80	2.00				
Spring	1	60	1.50				
Sand Creek	15	1,570	39.25				
East Trib. Sand Creek	3	280	7.00				
Fisher Creek	1	100	2.50				
Norden Creek	1	100	2.50				
Unnamed Coulee	1	All	---				
Unnamed Coulee	0	0	0				
Spring	1	40	1.00				
Unnamed Coulee	1	All	---				
Grand View Spring	1	120	3.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Black Coulee	11	2,620	65.50				
West Branch Black Coulee	8	680	17.00				
Spring Creek	1	120	3.00				
Bear Paw Coulee	2	200	5.00				
Franklin Coulee	1	120	3.00				
Spring	1	40	1.00				
Spring Creek	1	20	0.50				
East Fork Spring Creek	1	20	0.50				
Volcano Creek	2	320	8.00				
Volcano Spring	1	200	5.00				
Spring	1	80	2.00				
Spring	1	80	2.00				
North Walkers Coulee	1	800	20.00				
East Fork Black Coulee	10	2,080	52.00				
North Fork East Fork Black Coulee	2	120	3.00				
Jacobson Coulee	1	200	5.00				
Bills Coulee	0	0	0				
Unnamed Coulee	1	All	---				
Lannon Coulee	0	0	0				
Lannon Spring	1	80	2.00				
Lion Camp Spr. & Sinclair Spr.	1	120	3.00				
Unnamed Coulee	0	0	0				
Spring	2	80	2.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Total Birch Creek and Tributaries	**84**	**10,330**	**258.25**				
Raglan Coulee	1	200	5.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				

*Names of streams indented on the left-hand margin indicate that they are tributaries of the first stream named above which is not indented.

WATER RIGHT DATA—BLAINE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

APPROPRIATIONS
(Filings of Records)

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Bullwhacker Coulee	7	600	15.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	3,200	80.00				
Unnamed Coulee	2	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
West Fork Bullwhacker	0	0	0				
Unnamed Coulee	1	All	---				
Christianson Br. Bullwhacker Coulee	2	200	5.00				
Bear Paw Springs	2	60	1.50				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	3	400	10.00				
Unnamed Coulee	1	All	---				
Lion Coulee (W. Br. Bullwhacker Cr.)	4	4,320	108.00				
Unnamed Coulee	1	All	---				
North Fk. Lion Coulee	2	760	19.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	2	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	0	0	0				
Unnamed Coulee	1	All	---				
Unnamed Coulee	3	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Little Bullwhacker Creek	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Total Bullwhacker Creek and Tributaries	**50**	**9,540**	**238.50**				
Cow Creek	23	8,276	206.90	2343	3	145	3.63
Hendersons Fork Cow Creek	4	540	13.50				
Northeast Branch Hendersons Fork	2	80	2.00				
Unnamed Springs	2	90	2.25				
West Branch Hendersons Fork	3	200	5.00				
Moores Fork Cow Creek	7	610	15.25				
Spring	2	120	3.00				
Unnamed Coulee	1	40	1.00				
North Fork Cow Creek (Bentel Cr.)	9	920	23.00				
West Tributary North Fork	2	300	7.50				
Spring Creek	3	470	11.75				
Mallons Fork Cow Creek	5	450	11.25				

WATER RIGHT DATA—BLAINE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

APPROPRIATIONS
(Filings of Records)

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Reisens Fork	1	160	4.00				
Spring	1	60	1.50				
Campbell Coulee	1	200	5.00				
Spring (North) Coulee	3	160	4.00				
Hedges Creek	3	320	8.00	2343	3	2,000	50.00
North Fork Hedges Creek	1	100	2.50				
West Fork Hedges Creek	1	100	2.50				
Sols Creek	2	160	4.00				
Gap Creek	3	440	11.00				
Spring Creek	1	50	1.25				
Skunk (Casey) Coulee	2	160	4.00				
Deep Creek	1	200	5.00				
North Fork Gap Creek	1	400	10.00				
Lewis Creek	0	0	0				
Quaking Ash Creek	1	200	5.00				
Gold Creek	3	500	12.50				
West Fork Gap Creek	2	800	20.00				
Spring	1	50	1.25				
Spring	1	80	2.00				
Bird Tail Creek	1	150	3.75				
Winters Creek	4	700	17.50				
East Branch Winters Creek	1	200	5.00				
Hensen (Sneider) Creek	6	1,040	26.00				
Slade Creek	1	80	2.00				
Sand Creek	1	200	5.00				
Dogtown Creek	3	800	20.00				
Als Creek	5	880	22.00				
West Tributary Als Creek	1	80	2.00				
Unnamed Spring	1	80	2.00				
Owl Creek	1	40	1.00				
Spring Creek	1	100	2.50				
Unnamed Coulee	1	2,000	50.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	2,000	50.00				
Suction Creek	14	6,560	164.00				
North Branch Suction Creek	3	560	14.00				
West Fork Suction Creek	1	60	1.50				
Logan Creek	6	1,600	40.00				
Cromley Creek (Br. Logan Cr.)	4	1,160	29.00				
Thomlinson Coulee	1	200	5.00				
East Fork Suction Creek	1	160	4.00				
Big Coulee (Rock Creek)	4	1,100	27.50				
Unnamed Coulee	1	20,000	500.00				

WATER RIGHT DATA—BLAINE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAM	APPROPRIATIONS (Filings of Records) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Jacks Coulee	0	0	0				
West Fork Jacks Coulee	1	200	5.00				
Rattlesnake Creek (Alkali Coulee)	2	600	15.00				
Honeymoon Creek	2	280	7.00				
Spring Creek	3	480	12.00				
Spring	1	50	1.25				
Little Suction Creek	0	0	0				
Dyer Coulee	1	All	---				
Flat Creek	1	400	10.00				
Tin Horn Coulee	4	560	14.00				
Rimrock Coulee	1	40	1.00				
Unnamed Coulee	1	80	2.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	2	All	---				
Unnamed Coulee	0	0	0				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Right Coulee	1	All	---				
Unnamed Coulee	3	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Middle Coulee	2	All	---				
Unnamed Coulee	1	All	---				
Left Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Squaw Creek	0	0	0				
Hay Coulee	0	0	0				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Coal Mine Coulee	0	0	0				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Cabin Creek	0	0	0				
Unnamed Coulee	1	All	---				
Total Cow Creek and Tributaries	202	58,676	1,466.90				
Milk River	77	533,382	13,334.55	653	2	10,062	251.55
Box Elder Creek	4	10,900	272.50				
Kearful Coulee	2	600	15.00				
Wolf Coulee	2	407	10.18				
Davey Coulee	2	1,100	27.50				
Bottoff Coulee	4	1,300	32.50				
Gopher Coulee (Skeleton)	2	200	5.00				
Duck Pond Reservoir	1	1,000	25.00				
Clear Creek	67	23,070	576.75	654	2	3,080	.77
Boyle Creek	1	160	4.00				
Middle Fork Clear Creek	3	100	2.50				
West Fk. Middle Fk. Clear Cr.	3	80	2.00				

WATER RIGHT DATA—BLAINE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAM	APPROPRIATIONS (Filings of Records) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
South Trib. Middle Fk. Clear Cr.	3	80	2.00				
Spring	1	40	1.00				
Harmon Creek	1	160	4.00				
Spring	1	20	0.50				
Unnamed Coulee	0	0	0				
Spring	1	10	0.25				
East Fk. Middle Fk. Clear Cr.	1	100	2.50				
Spring	1	10	0.25				
Scott Creek	3	270	6.75				
North Trib. Middle Fk. Clear Cr.	1	40	1.00				
Unnamed Coulee	0	0	0				
Spring	1	20	0.50				
West Trib. Middle Fk. Clear Cr.	3	120	3.00				
West Fork Clear Creek	4	460	11.50				
Reservoir Coulee	1	40	1.00				
Tributary of West Fork Clear Cr.	1	50	1.25				
North Trib. West Fk. Clear Cr.	1	80	2.00				
East Fork Clear Creek	7	460	11.50				
Spring	1	20	0.50				
Hofeldt Coulee	2	80	2.00				
Spring	1	40	1.00				
Unnamed Coulee	2	80	2.00				
Setz (East Fk. East Fk.) Creek	5	280	7.00				
Spring	2	160	4.00				
Spring	1	80	2.00				
Unnamed Coulee	1	40	1.00				
Reservoir	1	40	1.00				
Mill (Battle) Creek	3	310	7.75				
North Tributary Mill Creek	2	106	2.65				
3 Tributaries	1	120	3.00				
Spring	1	40	1.00				
Gulch (Greenbough Coulee) Creek	1	40	1.00				
Unnamed Coulee	0	0	0				
Spring	2	140	3.50				
Youngs Gulch	2	240	6.00				
Felton Coulee	3	520	13.00				
Mosser Creek	1	160	4.00				
Thompsons Coulee	2	400	10.00				
Bennett Coulee	5	400	10.00				
Unnamed Coulee	1	80	2.00				
Hill Creek	1	80	2.00				
Flossy Creek	1	60	1.50				
Basin Creek	5	440	11.00				
West Tributary Basin Creek	1	80	2.00				
Patreau Creek	1	180	4.50				
Wind (Winn) Creek	8	2,800	70.00				
East Branch Wind Cr.	3	260	6.50				
Middle Fk. Wind Cr.	1	200	5.00				
Grindstone Creek	6	620	15.50				
Roys Reservoir	1	100	2.50				

WATER RIGHT DATA—BLAINE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

APPROPRIATIONS
(Filings of Records)

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Coulee	0	0	0				
Spring	1	80	2.00				
Unnamed Coulee	0	0	0				
Spring	1	20	0.50				
Porcupine Creek	1	40	1.00				
Blue Grass Coulee	1	40	1.00				
Cottonwood Coulee	2	280	7.00				
Snow Coulee	1	200	5.00				
Spring Coulee	1	200	5.00				
Unnamed Coulee	0	0	0				
Tripletts Spring	1	40	1.00				
Unnamed Coulee	0	0	0				
Spring	1	80	2.00				
Cedar Creek	1	400	10.00				
Murray Coulee	3	820	20.50				
Spring	1	160	4.00				
Spring Reservoir	1	20	0.50				
Flinders Coulee	2	720	18.00				
Reservoir Coulee	1	400	10.00				
Tiger Ridge Lake	1	400	10.00				
Sprinkle Coulee	1	120	3.00				
Unnamed Coulee	0	0	0				
Finchs Lake	1	120	3.00				
Total Clear Creek and Tributaries	**195**	**37,706**	**942.65**				
Red Rock Coulee	15	19,600	490.00				
Unnamed Coulee	1	400	10.00				
Unnamed Coulee	1	800	20.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Wrights Coulee	1	160	4.00				
Dry (Reservoir) Coulee	2	2,120	53.00				
Unnamed Coulee	1	400	10.00				
Walters Creek	1	120	3.00				
Unnamed Coulee	2	1,000	25.00				
Badger Coulee	1	500	12.50				
Davidson Coulee	2	520	13.00				
Unnamed Coulee	1	600	15.00				
Dry Coulee	1	250	6.25				
Hawkinson Coulee	1	120	3.00				
Rush Lake	1	300	7.50				
Total Red Rock Coulee and Tributaries	**33**	**26,890**	**672.25**				
Bennett Coulee	2	1,400	35.00				
McKinnie (Bowes Lake) Coulee	2	400	10.00				
Three Mile Coulee	4	2,100	52.50				
Cupp Coulee	1	400	10.00				
Black Coulee	10	4,000	100.00				
Waxon Coulee	1	320	8.00				
South Fork Black Coulee	1	280	7.00				
Lodge (W. Fk. Milk River) (W. Fk. Cr.) Creek	21	43,435	1,085.88				
Unnamed Coulee	0	0	0				
Unnamed Coulee	1	280	7.00				

WATER RIGHT DATA—BLAINE COUNTY
APPROPRIATIONS AND DECREES BY STREAMS

STREAM	APPROPRIATIONS (Filings of Records) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Holmes Creek	1	400	10.00				
Hay Coulee	4	2,240	56.00	2914	2	33,884	847.10
Unnamed Coulee	1	320	8.00				
Thibeaudeau Coulee	2	1,720	43.00				
North Fork Thibeaudeau Coulee	1	1,000	25.00				
Schmid (Wilson) Coulee	2	800	20.00				
Reser Coulee	4	1,120	28.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Thibeaudeau Coulee	1	200	5.00				
Total Lodge Creek and Tributaries	40	51,515	1,287.88				
Six Mile Coulee	4	2,220	55.50				
Alkali Spring	1	600	15.00				
Battle (North Fork Milk River) Creek	48	113,415	2,885.38				
Unnamed Coulee	1	600	15.00				
Wood Pile Coulee	2	2,400	60.00				
Corregan Coulee	1	560	14.00				
Twin Coulee	1	400	10.00				
Unnamed Coulee	1	400	10.00				
Unnamed Coulee	1	560	14.00				
Criswell Coulee	1	320	8.00				
East Fork Battle Creek	11	1,828	45.70				
Irving Coulee	2	840	21.00				
Unnamed Coulee	1	400	10.00				
Spring	1	40	1.00				
Unnamed Coulee	1	600	15.00				
Unnamed Coulee	2	16,000	400.00				
Unnamed Coulee	1	320	8.00				
Unnamed Coulee	1	680	17.00				
Lyons (N. Br. E. Fk.) (W. Br. E. Fk.) Coulee	2	280	7.00				
Henderson Creek	1	400	10.00				
Unnamed Coulee	1	840	21.00				
Unnamed Coulee	1	80	2.00				
Bennett Coulee	1	1,600	40.00				
Unnamed Coulee	1	All	---				
Franzen Coulee	1	1,000	25.00				
Peters Coulee	1	1,000	25.00				
(Horse) Corral Coulee	3	2,400	60.00				
South Fork Corral Coulee	1	200	5.00				
Unnamed Coulee	2	All	---				
Unnamed Coulee	1	120	3.00				
Hensen Coulee	1	200	5.00				
Unnamed Coulee	1	1,600	40.00				
Unnamed Coulee	1	1,720	43.00				
Unnamed Coulee	1	1,000	25.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	240	6.00				
Unnamed Coulee	1	80	2.00				
Scotchmans Creek	1	120	3.00				
Burrell Coulee	3	162,000	4,050.00				
Link Coulee	1	1,000	25.00				
Unnamed Coulee	1	All	---				

WATER RIGHT DATA—BLAINE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

(Filings of Records)

APPROPRIATIONS

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Choteau Coulee	14	4,170	104.25				
North Fork Choteau Coulee	8	2,040	51.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	200	5.00				
Ridge Coulee	1	200	5.00				
Dry Coulee (Hanson Coulee) (N. Fk. Wright Coulee)	2	50,160	1,254.00				
Gibbs Coulee	2	440	11.00				
Dry Fork	5	2,060	51.50				
Unnamed Coulee	2	720	18.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Sharnikon Gulch	2	1,400	35.00				
Coal Creek	5	2,290	57.25				
Unnamed Coulee	1	200	5.00				
Unnamed Coulee	1	400	10.00				
Unnamed Coulee	1	200	5.00				
Ronne Coulee	1	400	10.00				
Total Battle Creek and Tributaries	155	380,123	9,503.08				
Bosch Coulee	1	200	5.00				
Nine Mile (Lonetree) (Blackstone) Coulee	3	15,401	385.03				
West Branch Nine Mile Coulee	2	3,200	80.00				
Slough	1	400	10.00				
Reservoir (Birdwell) (Hebbleman) Coulee	4	1,380	34.50				
Matthew Coulee	1	500	12.50				
Fifteen Mile Coulee	9	3,140	78.50				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	300	7.50				
Unnamed Coulee	1	200	5.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
West Branch Fifteen Mile Coulee	1	400	10.00				
Wilsons Coulee	3	1,127	28.18				
Unnamed Coulee	1	600	15.00				
Dry Coulee Creek	2	1,200	30.00				
Murphy Coulee	4	2,320	58.00				
Zualtieri Coulee	2	400	10.00				
Nessler Creek	5	3,000	75.00				
Unnamed Coulee	1	2,000	50.00				
Unnamed Coulee	5	2,560	64.00				
Snake Creek	53	13,904	347.60				
Haystack (Purdy) Coulee	3	360	9.00				
Reservoir Coulee	2	40	1.00				
Sweet Coulee	0	0	0				
Sweet Spring	2	280	7.00				
Coal Mine Coulee	1	200	5.00				
Butte Coulee	1	80	2.00				
Griffin Spring Coulee	1	80	2.00				
Griffin Spring	1	40	1.00				

WATER RIGHT DATA—BLAINE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

APPROPRIATIONS
(Filings of Records)

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Little Snake Creek	4	1,100	27.50				
Spring Creek	1	240	6.00				
Harris Creek	1	100	2.50				
Sulphur Butte Creek	2	200	5.00				
Soft Water Springs	1	200	5.00				
Spring Creek (Cold Spring Coulee)	2	520	13.00				
Gold Creek	5	920	23.00				
Jessen (Ranch) Creek	1	200	5.00				
Ganty Creek	2	280	7.00				
Muir (Miller) Cr.	4	1,480	37.00				
Spring Coulee	1	600	15.00				
Maddux (Miles) Creek	7	1,680	42.00				
Granite Creek	1	400	10.00				
Spring Creek	4	1,320	33.00				
Butte Creek	1	100	2.50				
Barrell Spring	1	120	3.00				
Simmert Coulee	1	200	5.00				
Spring Coulee	2	280	7.00				
Schottz Coulee	1	80	2.00				
Bean Creek	48	20,742	518.55				
East Branch Bean Cr.	1	160	4.00				
Little Bean (Miller) Creek	3	720	18.00				
Unnamed Coulee	0	0	0				
Quacking Ash Spring	1	120	3.00				
Spring	1	40	1.00				
Spring	1	40	1.00				
Unnamed Coulee	0	0	0				
Willow Spring	2	90	2.25				
East Fk. Bean Creek (S. Fk.) (Dickson Coulee)	5	310	7.75				
Unnamed Coulee	0	0	0				
Wise Reservoir	3	600	15.00				
Southeast Branch E. Fk. Bean Cr.	2	170	4.25				
Unnamed Coulee	1	400	10.00				
Tiger Ridge Coulee	1	200	5.00				
Mann Coulee	2	220	5.50				
Dog Coulee	1	120	3.00				
Dalton Coulee	1	400	10.00				
Grasshopper Coulee	4	760	19.00				
Bailey Coulee	1	200	5.00				
Prairie Coulee	1	200	5.00				
Olsen Road Coulee (Victor)	2	400	10.00				
Canati Coulee	1	400	10.00				
Erickson Coulee	1	800	20.00				
Willman Coulee	1	400	10.00				
Henry's Coulee	1	320	8.00				
Luke Coulee	1	800	20.00				
Unnamed Coulee	0	0	0				
Spring	1	All	---				
Box Elder Creek	21	8,210	205.25				
Middle Branch Box Elder Cr. (Rock Creek)	2	280	7.00				

WATER RIGHT DATA—BLAINE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

APPROPRIATIONS
(Filings of Records)

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Ross Coulee	2	120	3.00				
Clear (Ross) Lake	1	80	2.00				
Jones Coulee (East Branch Box Cr.)	3	360	9.00				
O'Bryan Creek	1	200	5.00				
Kuhr Coulee	1	500	12.50				
Black Hills Coulee	1	200	5.00				
Vacation Coulee	1	200	5.00				
Dry Lake	1	200	5.00				
Hanson (Reservoir) Coulee	2	1,200	30.00				
Olson (Lopez) Coulee	3	1,000	25.00				
Hay Coulee	1	200	5.00				
Spring	1	All	---				
Martin Luke (Black) Coulee	3	8,800	220.00				
Fischer Coulee	2	400	10.00				
South Branch Black Coulee	2	360	9.00				
Total Snake Creek and Tributaries	**242**	**75,926**	**1,898.15**				
Coal Coulee	1	All	---				
Big Flat Coulee	1	280	7.00				
Unnamed Coulee	1	500	12.50				
Parallel (Thirty Mile) Creek	41	38,480	962.00	1126 2775	6 1*	Sufficient	
Unnamed Coulee	0	0	0				
Dry Lake	1	160	4.00				
West Fork Parallel Cr.	4	2,800	70.00				
Unnamed Coulee	1	400	10.00				
Unnamed Coulee	1	All	---				
Gumbo Coulee	1	200	5.00				
Unnamed Coulee	0	0	0				
Dry Lake	1	200	5.00				
East Fork Parallel Cr.	2	160	4.00				
Cliff Coulee	2	320	8.00				
Unnamed Coulee	1	400	10.00				
Unnamed Coulee	0	0	0				
Dry Lake	2	560	14.00				
Unnamed Coulee	1	400	10.00				
Buckley Coulee	2	1,400	35.00				
Vennum Coulee	1	400	10.00				
Noon (Forgey) Creek	9	5,600	140.00				
West Branch Forgey Creek	3	560	14.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	400	10.00				
Total Parallel Creek and Tributaries	**75**	**52,440**	**1,311.00**				
Unnamed Coulee	1	400	10.00				
Unnamed Coulee	1	2,000	50.00				
Oleson Coulee	1	400	10.00				
Wayne Creek	17	40,800	1,020.00				
East Fork Wayne Cr.	1	600	15.00				
West Fork Wayne Cr.	1	400	10.00				
Unnamed Coulee	0	0	0				

*Ditch Decree on Parallel Creek

WATER RIGHT DATA—BLAINE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

APPROPRIATIONS
(Filings of Records)

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Coulee ..	1	720	18.00				
Unnamed Coulee	1	720	18.00				
Unnamed Coulee	1	1,600	40.00				
Unnamed Coulee	0	0	0				
Unnamed Coulee	1	800	20.00				
Badland Coulee	1	500	12.50				
Unnamed Coulee	1	80	2.00				
Unnamed Coulee	1	400	10.00				
Total Wayne Creek and Tributaries	**26**	**46,620**	**1,165.50**				
Unnamed Coulee	1	100	2.50				
Unnamed Coulee	1	All	---				
Water Tank Coulee	2	800	20.00				
Savoy Creek	26	26,840	671.00				
Middle Fork Savoy Cr.	1	10,000	250.00				
West Branch Savoy Cr.	3	200	5.00				
Unnamed Coulee	2	1,200	30.00				
Aveil Ravine	2	800	20.00				
LaChappelle Creek	1	1,200	30.00				
Branch Savoy Creek	1	400	10.00				
Lone Tree Coulee	7	5,000	125.00				
Black Creek	0	0	0				
Unnamed Coulee	1	600	15.00				
Unnamed Coulee	1	1,000	25.00				
Unnamed Coulee ..	1	All	---				
Unnamed Coulee	1	200	5.00				
Unnamed Coulee	1	320	8.00				
Unnamed Coulee	1	500	12.50				
Unnamed Coulee	2	400	10.00				
King Coulee	1	2,000	50.00				
Total Savoy Creek and Tributaries	**52**	**50,660**	**1,266.50**				
Unnamed Coulee	0	0	0				
Unnamed Coulee	1	1,200	30.00				
Jones Coulee	1	240	6.00				
Milk Creek	3	2,800	70.00				
Eureka Creek	6	7,580	189.50				
Unnamed Coulee	2	1,400	35.00				
Peoples Creek	59	20,203	505.08				
Peters Coulee	1	160	4.00				
North Branch Peoples Creek	6	20,390	509.75				
Unnamed Coulee	1	80	2.00				
Tributary	1	20	0.50				
South Branch Peoples Cr. (Anderson Cr.)	16	1,105	27.63				
Unnamed Spring	2	20	0.50				
Spring Creek	1	40	1.00				
Hofeldt Creek	9	660	16.50				
Branch Hofeldt Cr. ..	1	40	1.00				
Spring	2	65	1.63				
South Tributary Peoples Creek	5	520	13.00				
Setz Creek	5	600	15.00				
Unnamed Coulee	2	120	3.00				
Unnamed Coulee ..	1	40	1.00				

WATER RIGHT DATA—BLAINE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

APPROPRIATIONS
(Filings of Records)

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Coulee	0	0	0				
Spring	1	20	0.50				
Unnamed Coulee	0	0	0				
Spring	1	40	1.00				
North Tributary Peoples Creek	3	380	9.50				
Unnamed Coulee	0	0	0				
Spring	1	20	0.50				
Willow Creek	6	1,235	30.88				
Southwest Tributary Peoples Creek	4	420	10.50				
Spring Creek	1	120	3.00				
Prairie Gulch (Gulch Creek)	5	770	19.25				
Grouse (Muddy Cr.)	5	660	16.50				
Bear Creek	7	1,080	27.00				
Gold Creek	4	460	11.50				
Spring Creek	1	200	5.00				
W. Branch Spring Creek	1	80	2.00				
Spring (Barber) Creek	1	10	0.25				
Unnamed Coulee	0	0	0				
Unnamed Spring	2	920	23.00				
Kuhr Creek	1	100	2.50				
Revey Creek	10	1,670	41.75				
Lewis Creek	2	40	1.00				
Spring Creek	1	160	4.00				
Spring	2	200	5.00				
Spring	1	100	2.50				
Timber Creek	6	900	22.50				
Crown Butte Creek	6	820	20.50				
Nicholson (Bluff) Cr.	3	420	10.50				
Schulz Creek	1	4	0.10				
Unnamed Coulee	0	0	0				
Cone Spring	1	40	1.00				
Cleveland Spring	3	500	12.50				
Adams Coulee	1	400	10.00				
O'Brien Creek	4	1,500	37.50				
Spring	1	120	3.00				
Spring Coulee	1	160	4.00				
Kuhr Coulee (Hay Road Coulee)	3	520	13.00				
Lake	1	200	5.00				
Trout (Spring) (Maggies) Creek	3	650	16.25				
Eagle Lake	1	250	6.25				
Spring Creek	1	30	0.75				
McCormack Coulee	2	540	13.50				
Surprise Spring Creek (Columbia) (Marion)	6	1,820	45.50				
Olson Coulee	1	500	12.50				
Unnamed Coulee	0	0	0				
Meadow Run Sprg.	1	120	3.00				
Parker Coulee	1	150	3.75				
Fogarty (St. Johns Cr.) Coulee	3	700	17.50				
Hillside Coulee	1	200	5.00				
Myrtle Creek	4	960	24.00				
North Fk. Myrtle Cr.	1	200	5.00				

WATER RIGHT DATA—BLAINE COUNTY
APPROPRIATIONS AND DECREES BY STREAMS

APPROPRIATIONS
(Filings of Records)

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
South Fk. Myrtle Cr.	1	200	5.00				
Al Loraine Creek	1	500	12.50				
Unnamed Coulee	1	All	---				
South Fk. Peoples Cr.	0	0	0				
Little Peoples Creek	0	0	0				
Mission Creek	1	500	12.50				
Howard Springs	1	100	2.50				
Total Peoples Creek and Tributaries	233	65,752	1,643.82				
Dodson Creek	0	0	0				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	960	24.00				
Unnamed Coulee	1	400	10.00				
Cottonwood Creek	0	0	0				
Woody Island Creek	18	22,880	572.00				
Silver Bow Springs	2	120	3.00				
Unnamed Coulee	0	0	0				
Cherry Patch Lake	1	120	3.00				
Unnamed Coulee	0	0	0				
Setty Springs	1	80	2.00				
Branch Woody Island Creek	2	800	20.00				
Sids Coulee	1	200	5.00				
Murphy Coulee	6	16,900	422.50				
East Butte Coulee	2	540	13.50				
Oil Springs Coulee	2	600	15.00				
Unnamed Spring	1	100	2.50				
Mosquito Springs (Rake) Coulee	4	5,500	137.50				
Mosquito Spr'gs	1	1,500	37.50				
Salvation Coulee	1	9,000	225.00				
Silver Bow Coulee	1	1,200	30.00				
Malone Spring	1	20	0.50				
Buckley Coulee	9	6,800	170.00				
West Fork Buckley Coulee	1	800	20.00				
Unnamed Coulee	1	200	5.00				
Unnamed Coulee	1	All	---				
Matheson Spring	1	20	0.50				
Unnamed Coulee	1	All	---				
Unnamed Coulee	2	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	2	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	3	All	---				
Little Jewel (Black) Coulee	0	0	0				
Reservoir Spring Coulee	1	200	5.00				
South Branch Little Jewel Coulee	0	0	0				
Unnamed Coulee	1	1,000	25.00				
Unnamed Coulee	1	800	20.00				

WATER RIGHT DATA—BLAINE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

APPROPRIATIONS
(Filings of Records)

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
West Branch Black Coulee (Little Jewel) (Duck Lake Coulee)	6	2,400	60.00				
Unnamed Coulee	1	600	15.00				
Unnamed Coulee	1	100	2.50				
North Fork Little Jewel Coulee	1	All	---				
Jules Spring Creek	1	100	2.50				
Little Jule Spring Coulee	1	120	3.00				
Unnamed Coulee	1	100	2.50				
Unnamed Coulee	0	0	0				
Hay Lake	1	All	---				
Total Milk River and Tributaries	1,330	1,478,429	36,960.77				
GRAND TOTAL FOR BLAINE COUNTY	1,663	1,557,175	38,929.42		19	46,121.8	1,153.05

DRAINAGES IN BLAINE COUNTY NOT LOCATED

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.
Big Dry Gulch, Upper Fork	1	200	5.00
Hartt Creek	1	240	6.00
Little Horn Creek	1	500	12.50
Lukes Lake	1	40	1.00
Matts Creek	1	160	4.00
Meadow Coulee	2	800	20.00
Pollywog Creek	1	100	2.50
Rush Coulee	1	40,000	1,000.00
Sawtooth Creek	1	100	2.50
Saxon Creek	1	500	12.50
Spring Creek	1	160	4.00
Sweet Creek	1	1	0.03
Western Spring Creek	1	200	5.00
Unnamed Coulee	4	2,465	61.63
Columbia Lake	1	400	10.00
Freestone Twin Lake	1	All	---
Moores Lake	1	200	5.00
Swamps	1	200	5.00
Horseshoe Coulee Spring	1	All	---
Paddys Spring	1	All	---
Silver Springs	1	40	1.00
Springs	10	740	18.50
Total	**35**	**47,046**	**1,176.16**

WATER RESOURCES SURVEY

Blaine County, Montana

PART II

Maps Showing Irrigated Areas

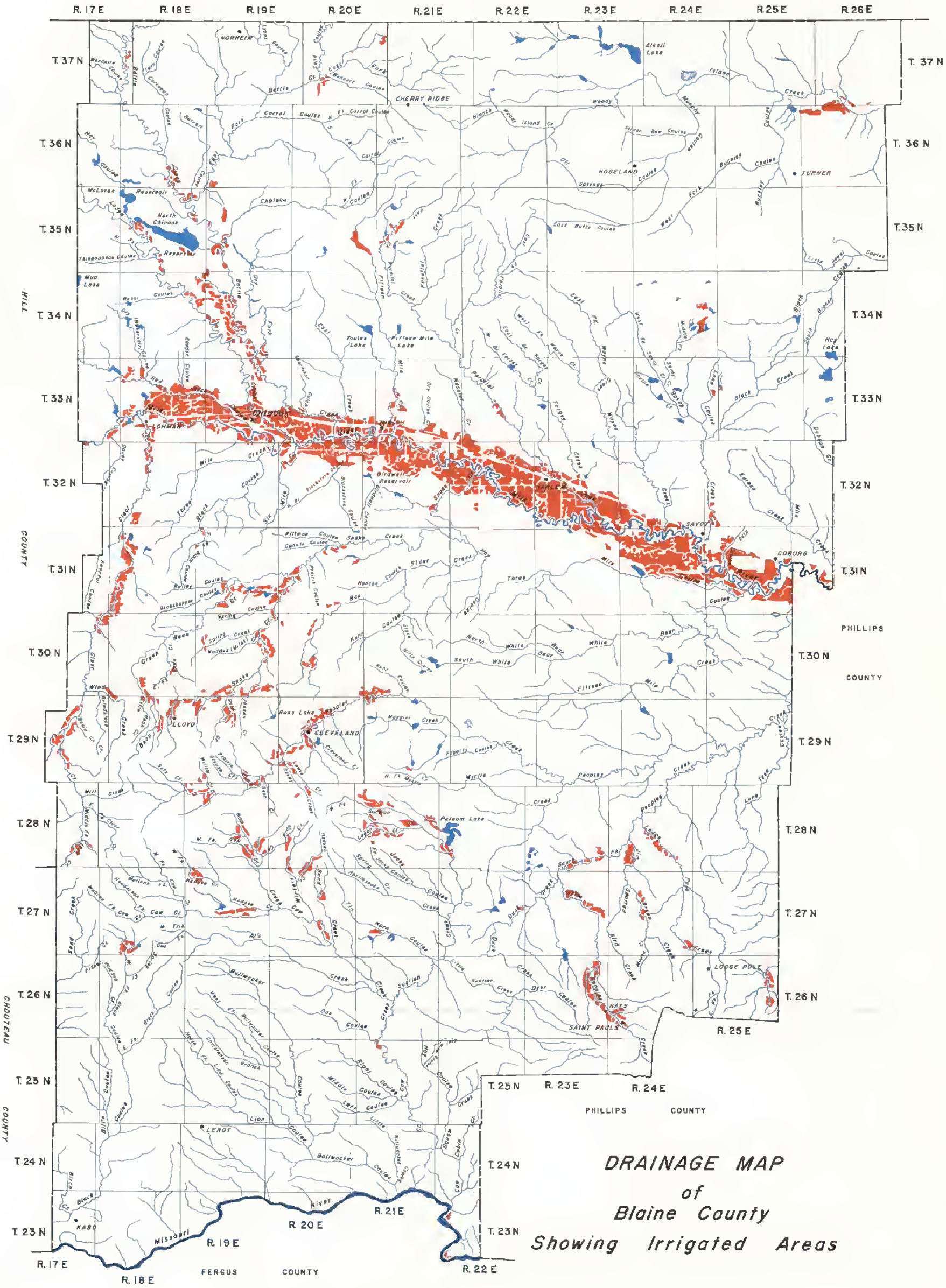
Published by
STATE WATER CONSERVATION BOARD
Helena, Montana
June, 1967

MAP INDEX

All maps have been made from aerial photographs.

DOMINION OF CANADA

SASKATCHEWAN



DRAINAGE MAP
of
Blaine County
Showing Irrigated Areas

MAP SYMBOL INDEX

BOUNDARIES

- COUNTY LINE
- NATIONAL FOREST LINE

DITCHES

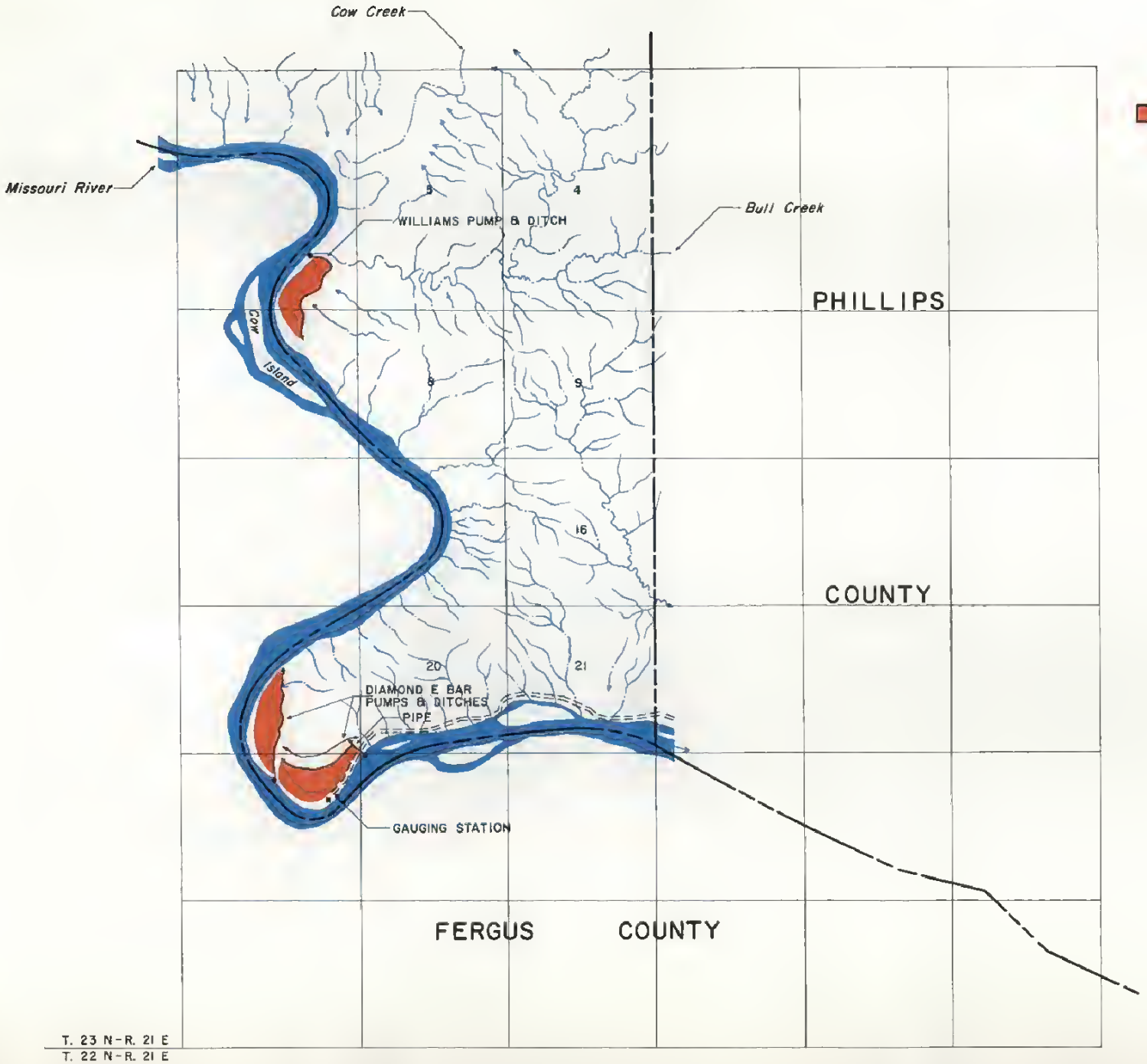
- CANALS OR DITCHES
- DRAIN DITCHES
- PROPOSED DITCHES

TRANSPORTATION

- PAVED ROADS
- UNPAVED ROADS
- RAILROADS
- STATE HIGHWAY
- U.S. HIGHWAY
- AIRPORT

STRUCTURES & UNITS

- DAM
- DIKE
- FLUME
- SIPHON
- SPILL
- SPRINKLER SYSTEM
- WEIR
- PIPE LINE
- PUMP
- PUMP SITE
- RESERVOIR
- WELL
- NATURAL CARRIER USED AS DITCH
- SPRING
- SWAMP
- GAUGING STATION
- POWER PLANT
- STORAGE TANK
- CEMETERY
- FAIRGROUND
- FARM OR RANCH UNIT
- LOOKOUT STATION
- RANGER STATION
- RAILROAD TUNNEL
- SCHOOL
- SHAFT, MINE, OR DRIFT

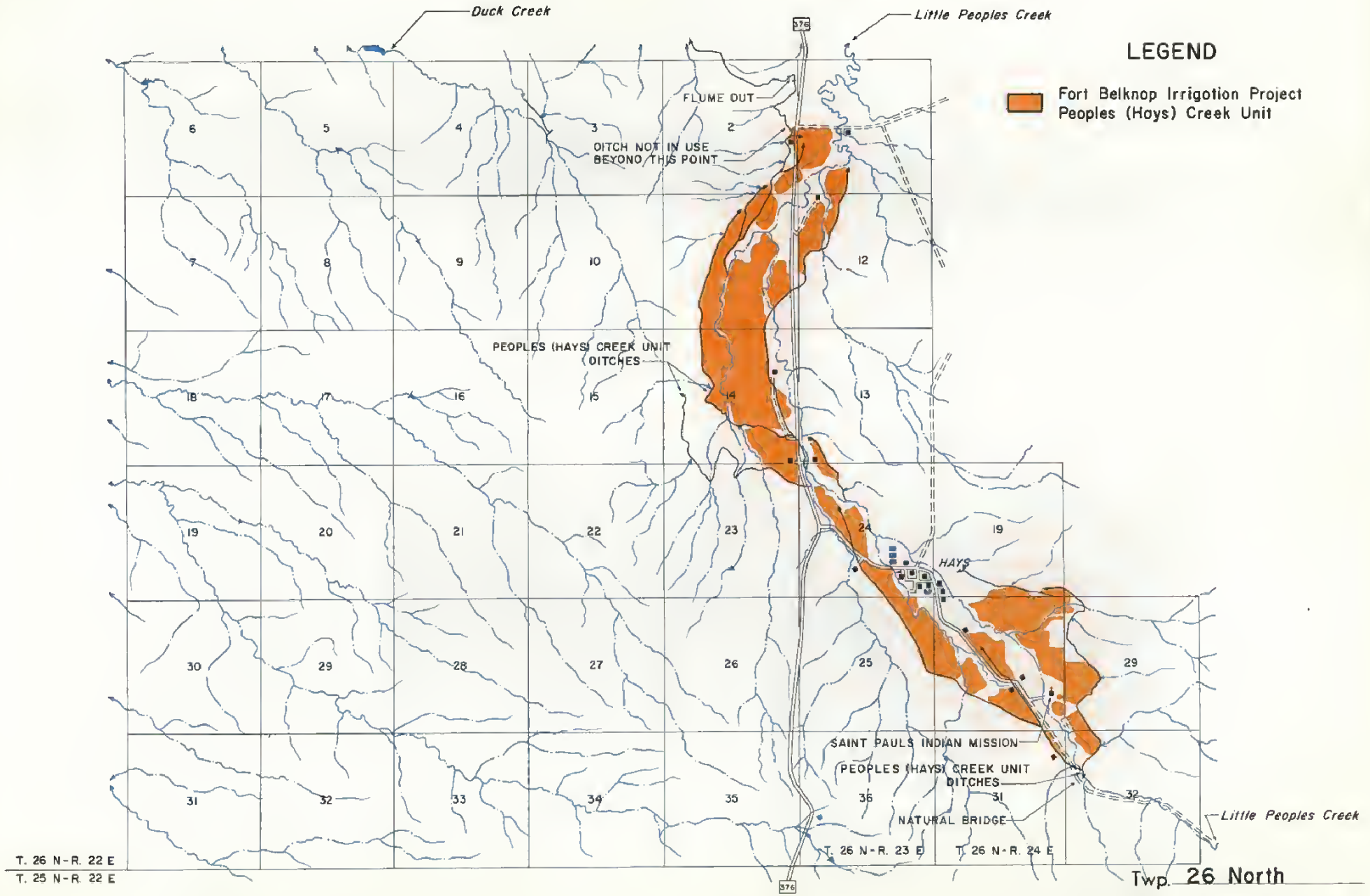


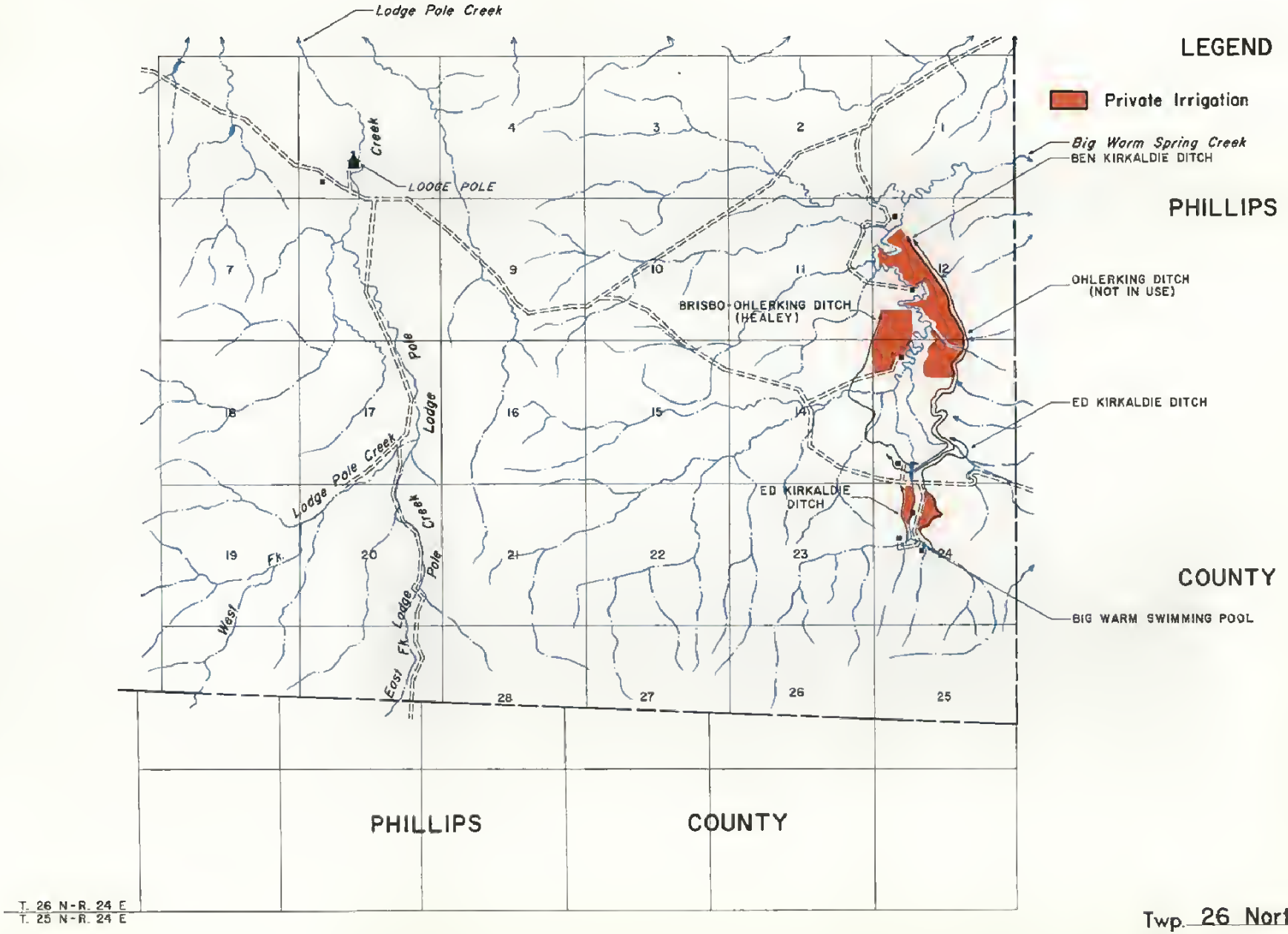
LEGEND

Private Irrigation

Twp. 23 North

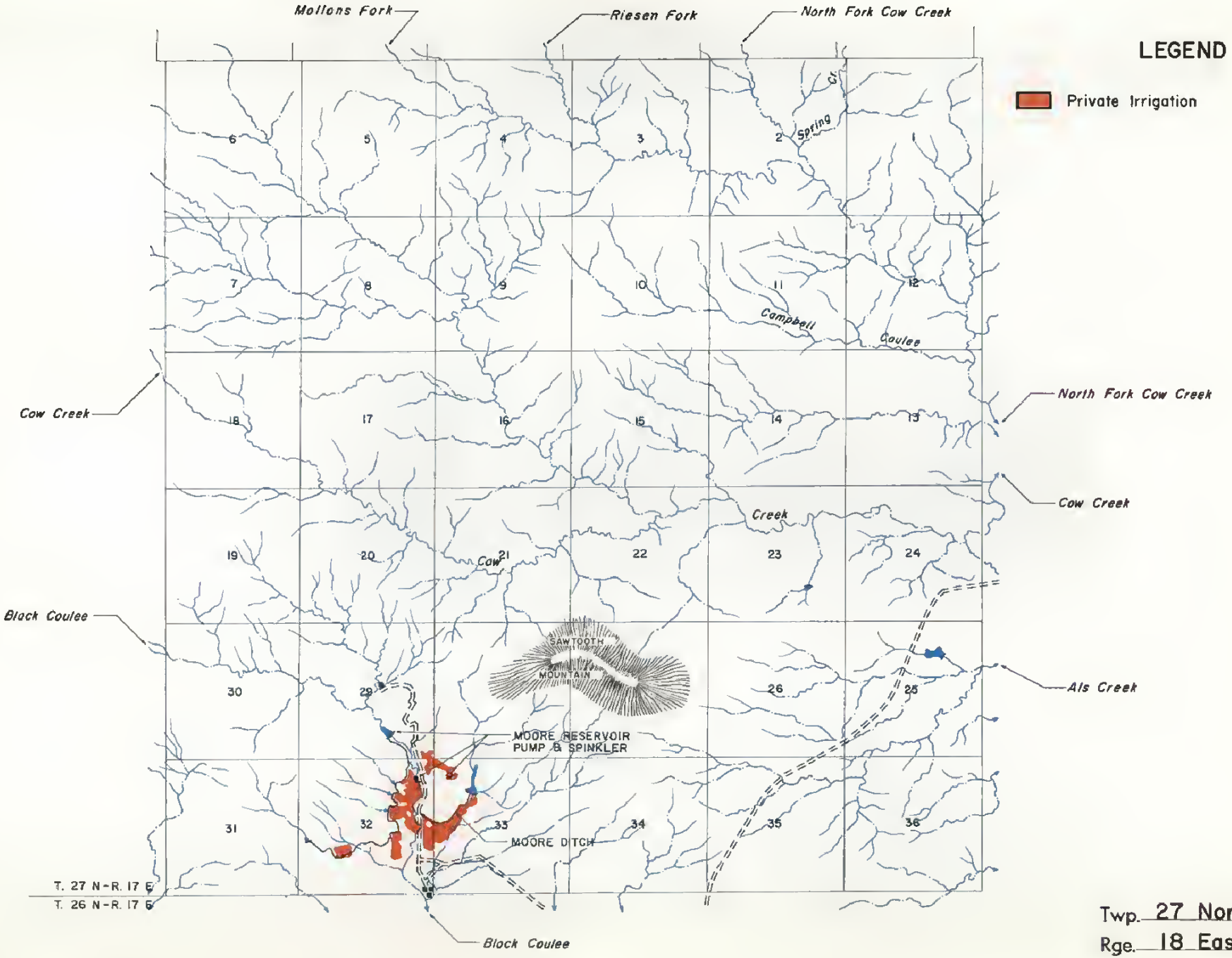
Rge. 22 East


Duck Creek
Little Peoples Creek
LEGEND
Fort Belknop Irrigotion Project
Peoples (Hoys) Creek Unit
FLUME OUT
DITCH NOT IN USE
BEYOND THIS POINT
PEOPLES (HAYS) CREEK UNIT
DITCHES
HAYS
SAINT PAULS INDIAN MISSION
PEOPLES (HAYS) CREEK UNIT
DITCHES
NATURAL BRIDGE
Little Peoples Creek
T. 26 N-R. 22 E
T. 25 N-R. 22 E
T. 26 N-R. 23 E
T. 26 N-R. 24 E
Twp. 26 North
Rge. 23 & 24 East



T. 26 N - R. 24 E
T. 25 N - R. 24 E

Twp. 26 North
Rge. 25 East

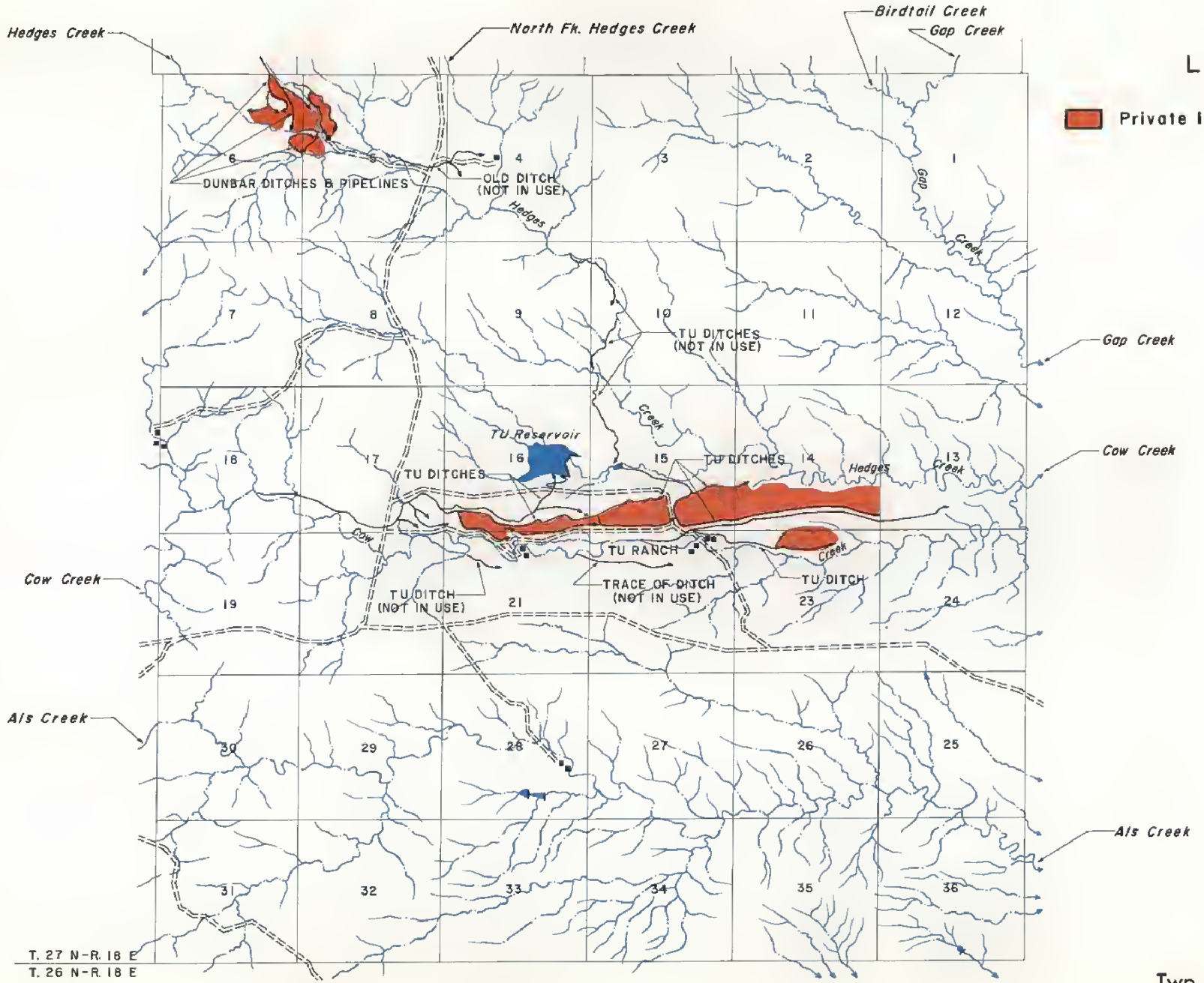


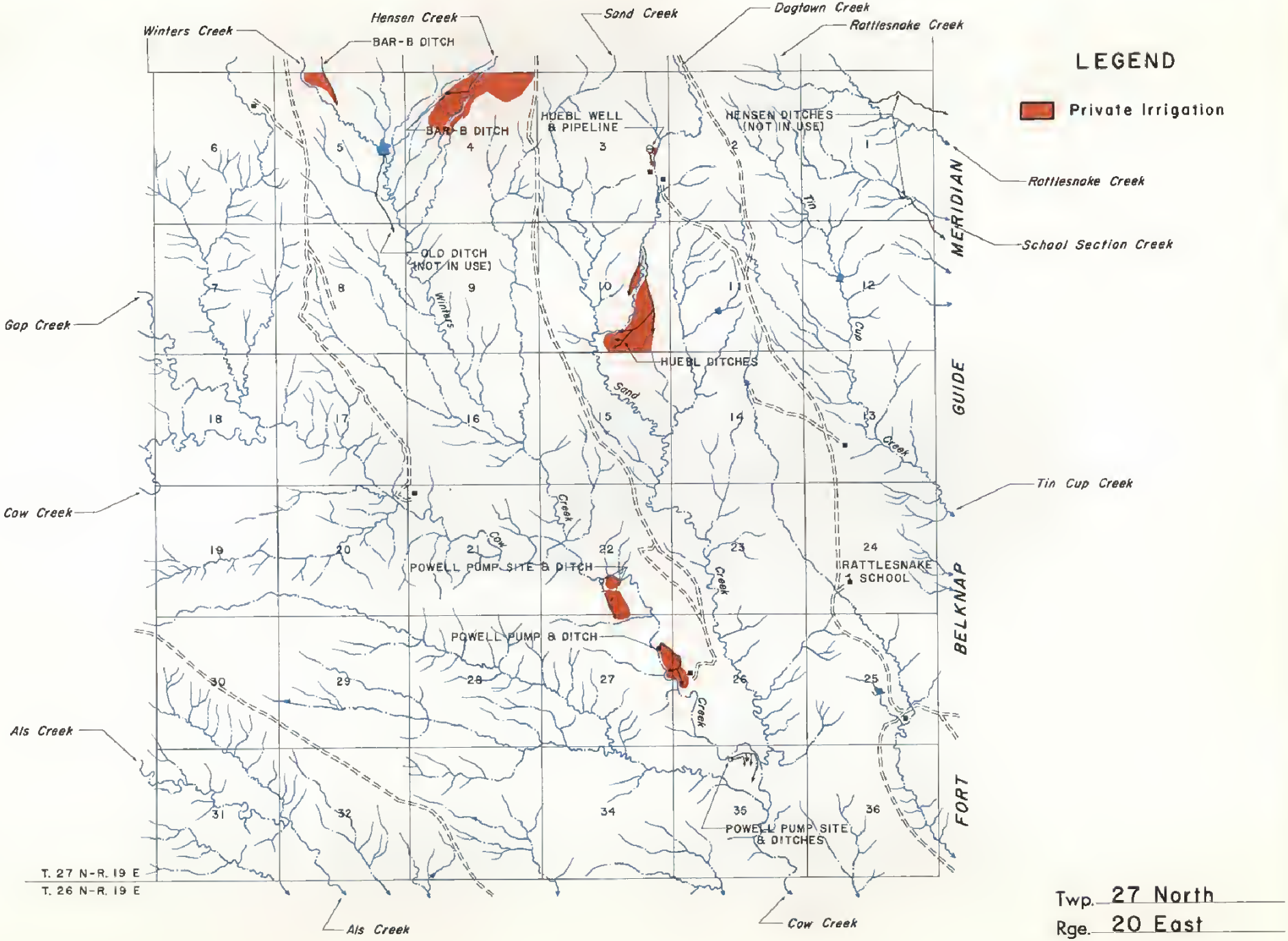
LEGEND

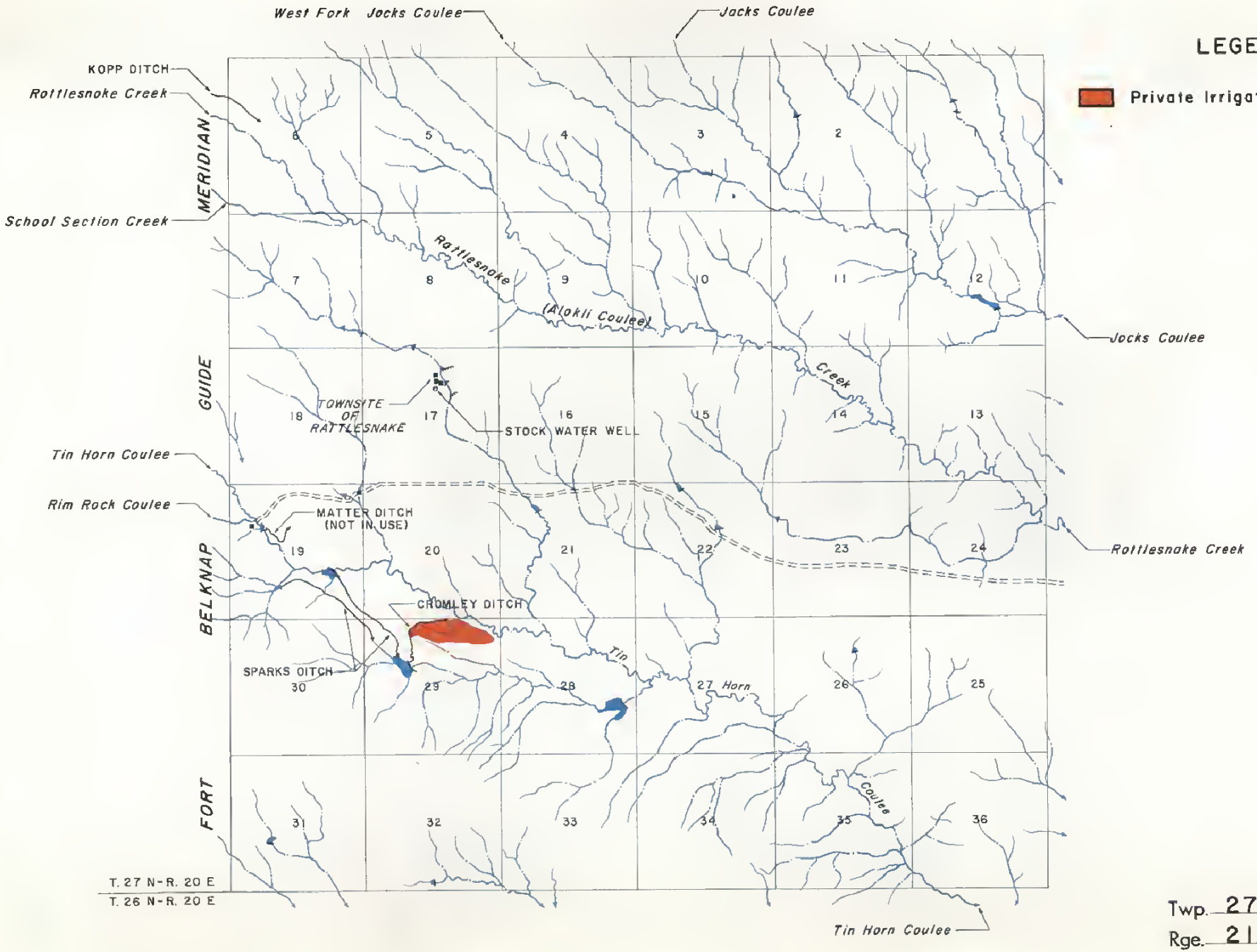
Private Irrigation

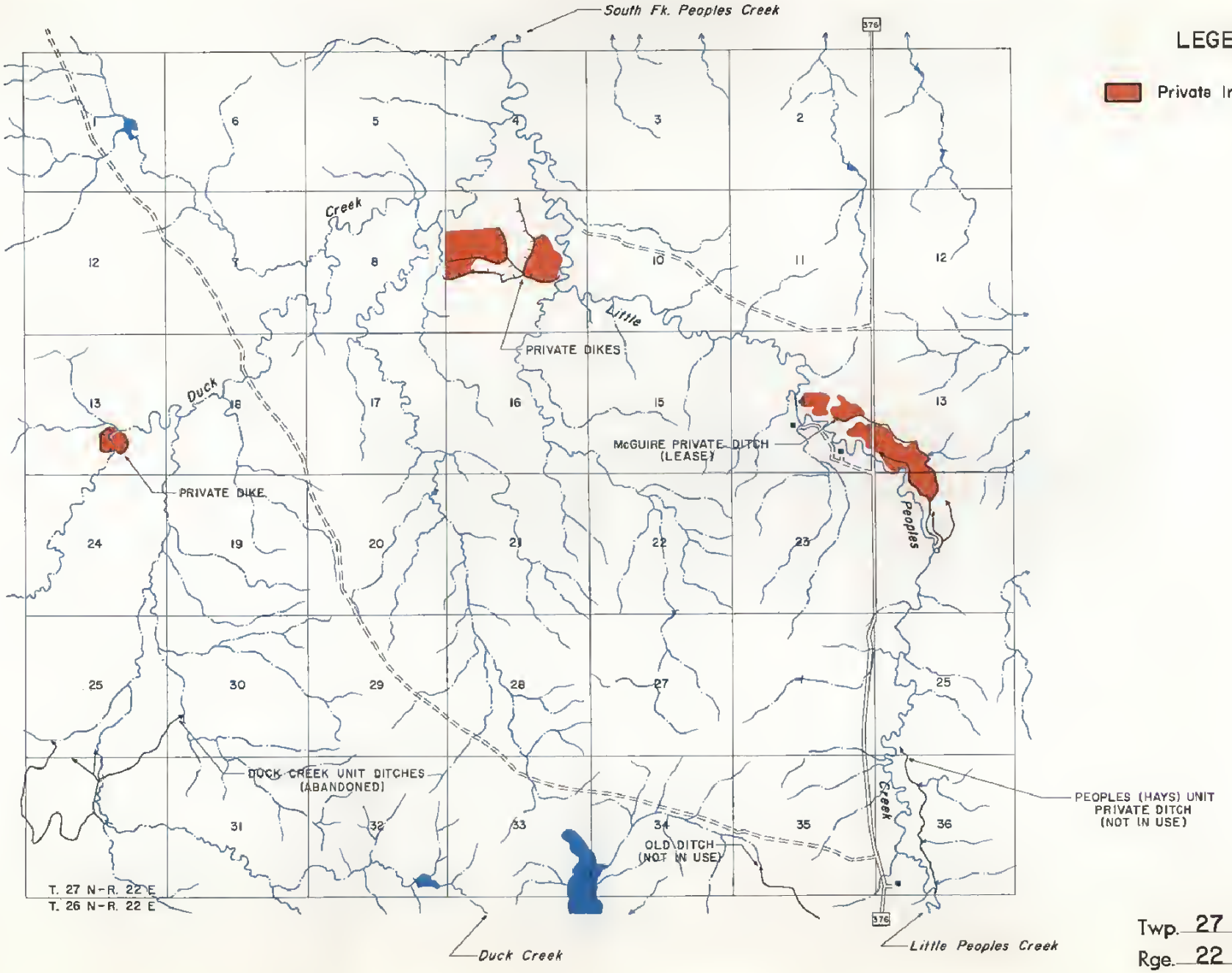
Twp. 27 North

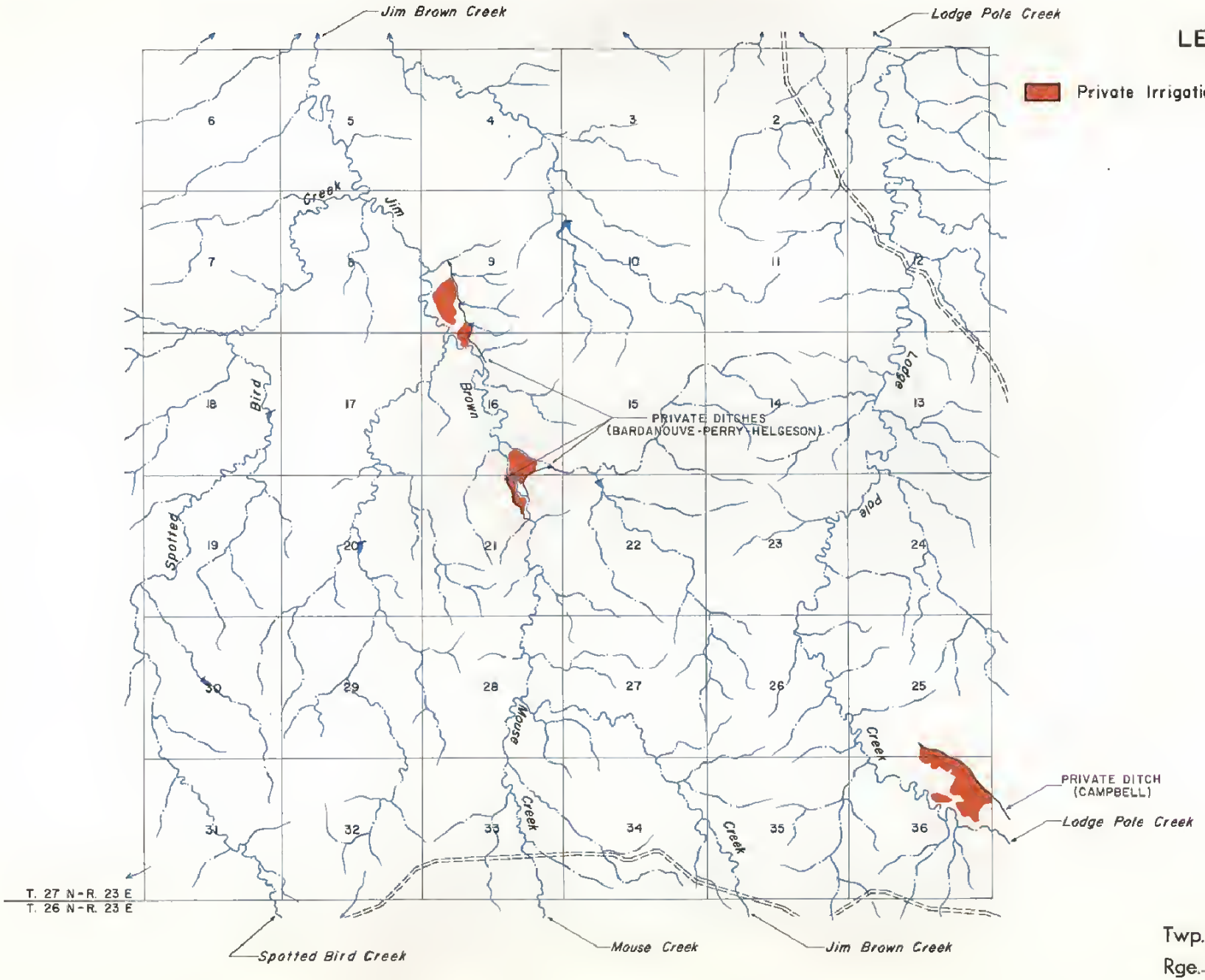
Rge. 18 East

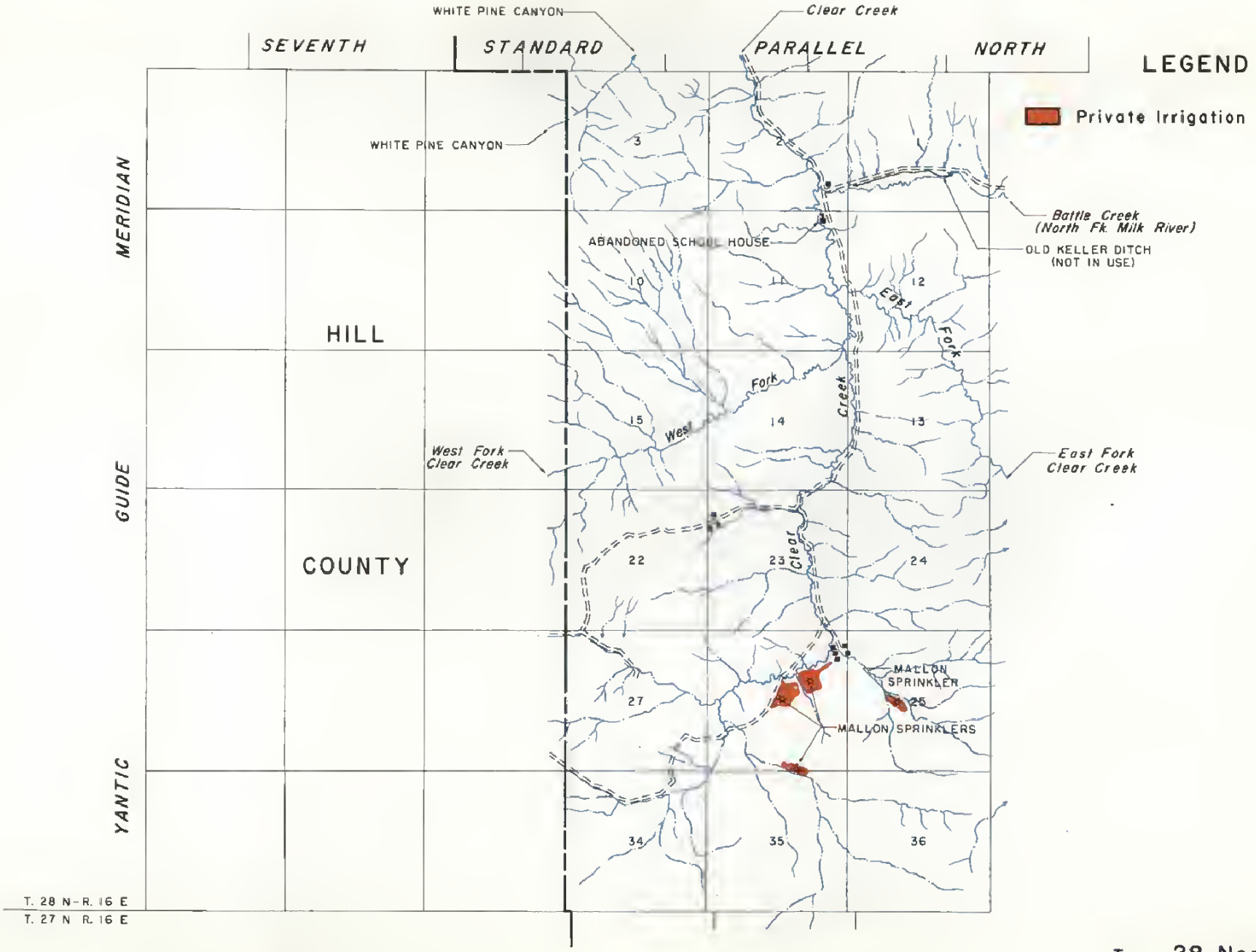

West Fk. Hedges Creek
North Fk. Hedges Creek
Birdtail Creek
Gap Creek
LEGEND
Private Irrigation
DUNBAR DITCHES & PIPELINES
OLD DITCH (NOT IN USE)
Hedges Creek
Gap Creek
TU DITCHES (NOT IN USE)
TU Reservoir
TU DITCHES
Cow Creek
TU RANCH
TRACE OF DITCH (NOT IN USE)
TU DITCH (NOT IN USE)
TU DITCH
Als Creek
T. 27 N-R. 18 E
T. 26 N-R. 18 E
Twp. 27 North
Rge. 19 East


Winters Creek
Hensen Creek
BAR-B DITCH
Sand Creek
Dogtown Creek
Rattlesnake Creek
BAR-B DITCH
HUEBL WELL & PIPELINE
HENSEN DITCHES (NOT IN USE)
Rattlesnake Creek
School Section Creek
OLD DITCH (NOT IN USE)
Gap Creek
HUEBL DITCHES
Tin Cup Creek
Cow Creek
POWELL PUMP SITE & DITCH
RATTLESNAKE SCHOOL
POWELL PUMP & DITCH
Als Creek
POWELL PUMP SITE & DITCHES
T. 27 N-R. 19 E
T. 26 N-R. 19 E
Als Creek
Cow Creek
MERIDIAN
GUIDE
BELKNAP
FORT
LEGEND
Private Irrigation
Twp. 27 North
Rge. 20 East

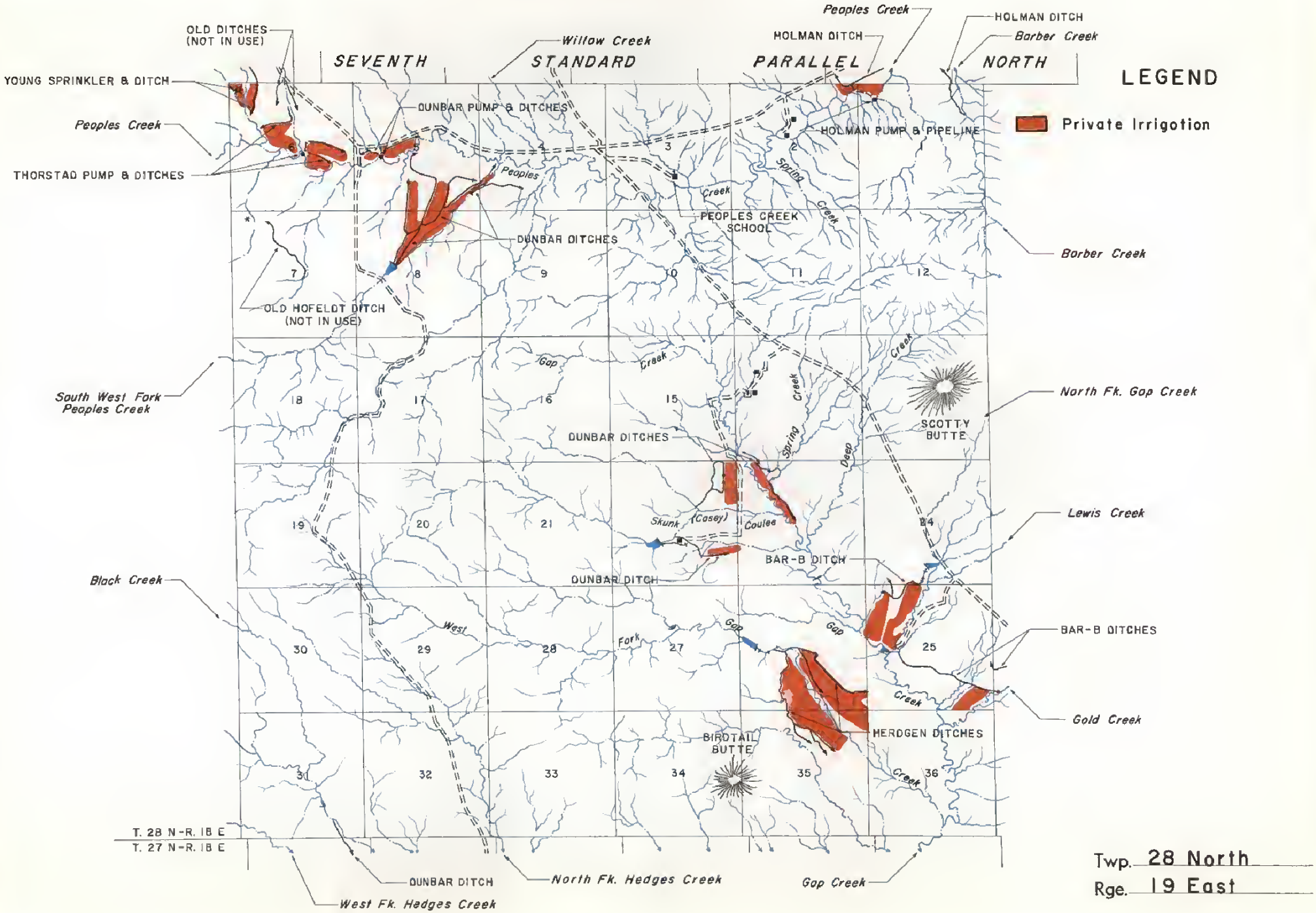

West Fork Jocks Coulee
Jocks Coulee
KOPP DITCH
Rattlesnake Creek
School Section Creek
MERIDIAN
GUIDE
BELKNAP
FORT
Rattlesnake
(Alokii Coulee)
Jocks Coulee
Creek
TOWNSITE OF RATTLESNAKE
STOCK WATER WELL
Tin Horn Coulee
Rim Rock Coulee
MATTER DITCH (NOT IN USE)
Rattlesnake Creek
CROMLEY DITCH
SPARKS DITCH
Tin
27 Horn
Coulee
Tin Horn Coulee
T. 27 N-R. 20 E
T. 26 N-R. 20 E
LEGEND
Private Irrigation
Twp. 27 North
Rge. 21 East

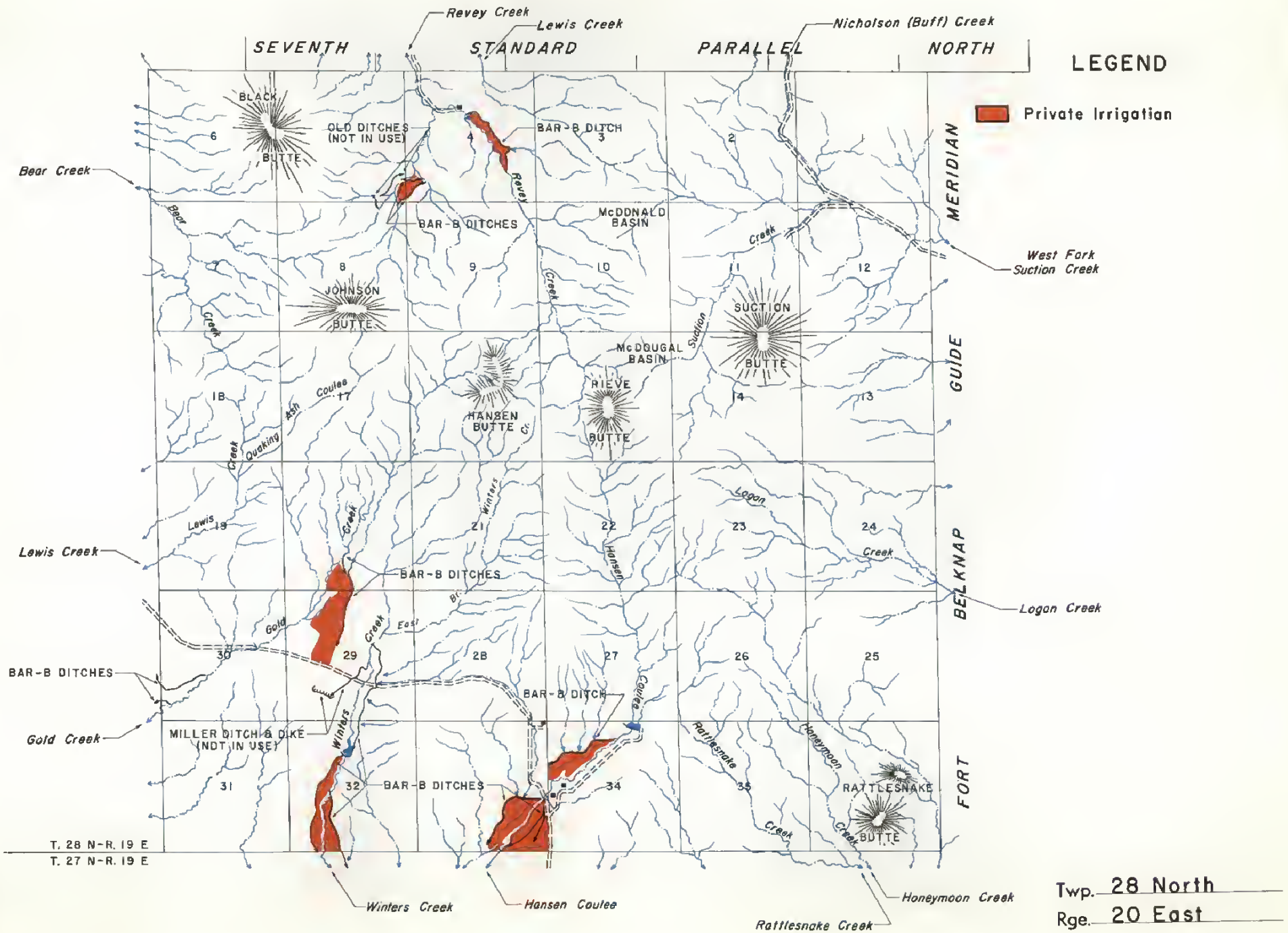

South Fk. Peoples Creek
376
LEGEND
Private Irrigation
Creek
Little
PRIVATE DIKES
Duck
McGUIRE PRIVATE DITCH
(LEASE)
PRIVATE DIKE
Peoples
DUCK CREEK UNIT DITCHES
(ABANDONED)
PEOPLES (HAYS) UNIT
PRIVATE DITCH
(NOT IN USE)
OLD DITCH
(NOT IN USE)
T. 27 N-R. 22 E
T. 26 N-R. 22 E
Duck Creek
Little Peoples Creek
Twp. 27 North
Rge. 22 & 23 East

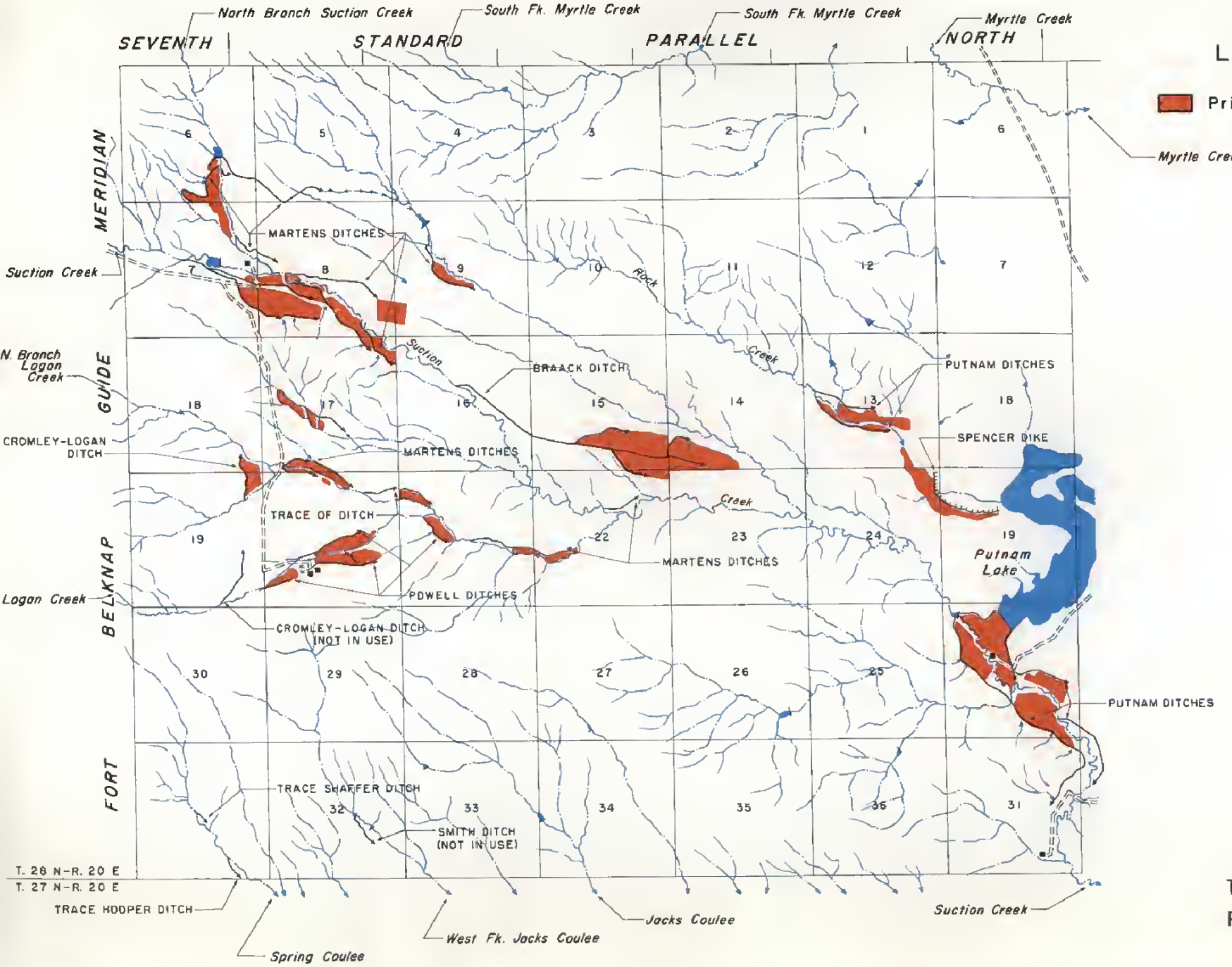

Jim Brown Creek
Lodge Pole Creek
LEGEND
Private Irrigation
Jim Brown Creek
Bird
Brown
Lodge Pole
Spotted
Mouse Creek
PRIVATE DITCHES
(BARDANOUVE-PERRY-HELGESON)
PRIVATE DITCH
(CAMPBELL)
Lodge Pole Creek
T. 27 N-R. 23 E
T. 26 N-R. 23 E
Spotted Bird Creek
Mouse Creek
Jim Brown Creek
Twp. 27 North
Rge. 24 East



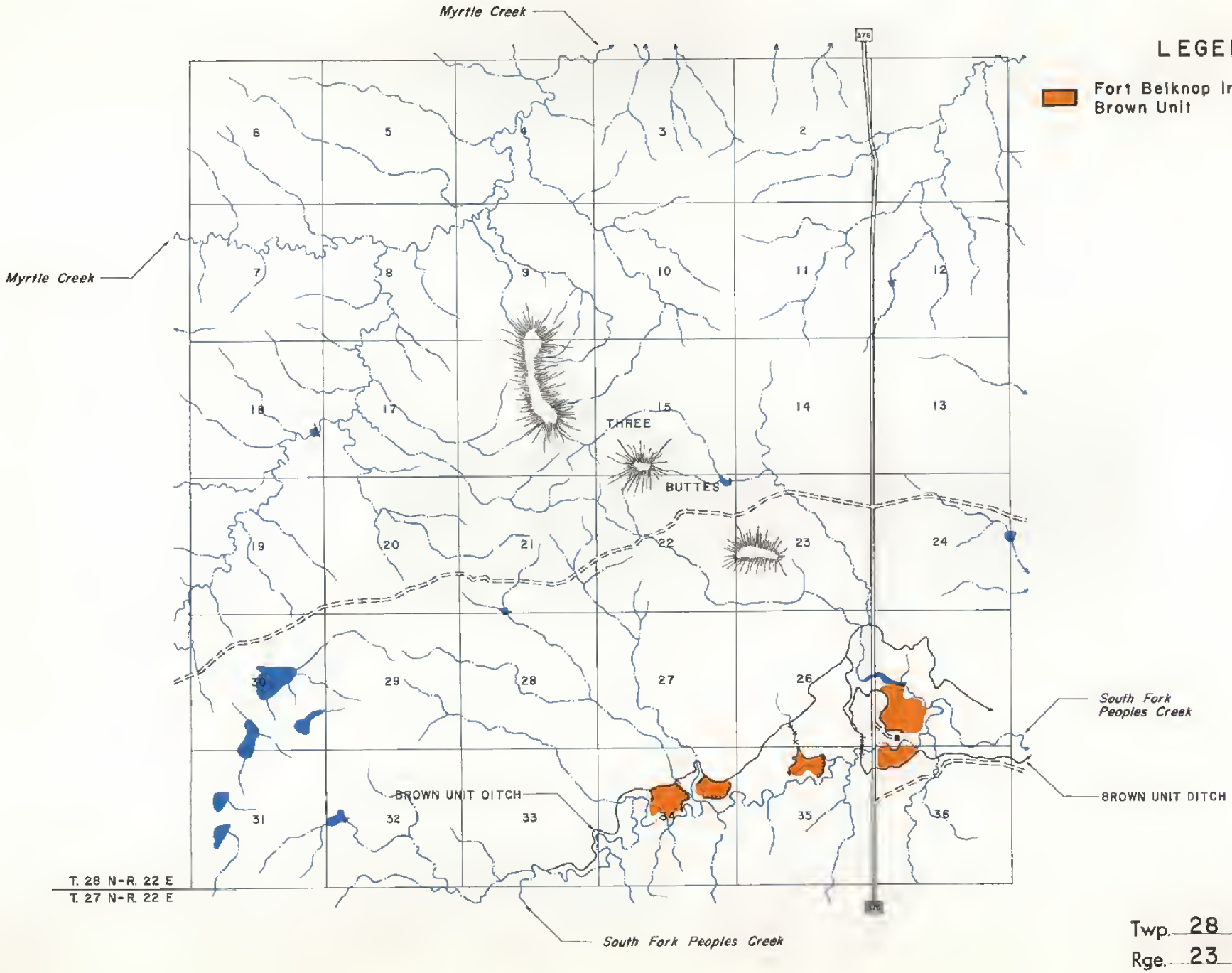
Twp. 28 North
Rge. 17 East


OLD DITCHES (NOT IN USE)
SEVENTH
Willow Creek
STANDARD
PARALLEL
Peoples Creek
HOLMAN DITCH
HOLMAN DITCH
Barber Creek
NORTH
YOUNG SPRINKLER & DITCH
Peoples Creek
THORSTAD PUMP & DITCHES
DUNBAR PUMP & DITCHES
HOLMAN PUMP & PIPELINE
Spring Creek
Peoples Creek
PEOPLES CREEK SCHOOL
DUNBAR DITCHES
Barber Creek
OLD HOFELDT DITCH (NOT IN USE)
South West Fork Peoples Creek
Gap Creek
Spring Creek
North Fk. Gap Creek
SCOTTY BUTTE
DUNBAR DITCHES
Deep Creek
Lewis Creek
Skunk (Casey) Coulee
BAR-B DITCH
Black Creek
DUNBAR DITCH
West Fork Gap Creek
BAR-B DITCHES
Gold Creek
HERDGEN DITCHES
BIRDTAIL BUTTE
T. 28 N-R. 18 E
T. 27 N-R. 18 E
DUNBAR DITCH
West Fk. Hedges Creek
North Fk. Hedges Creek
Gap Creek
LEGEND
Private Irrigation
Twp. 28 North
Rge. 19 East

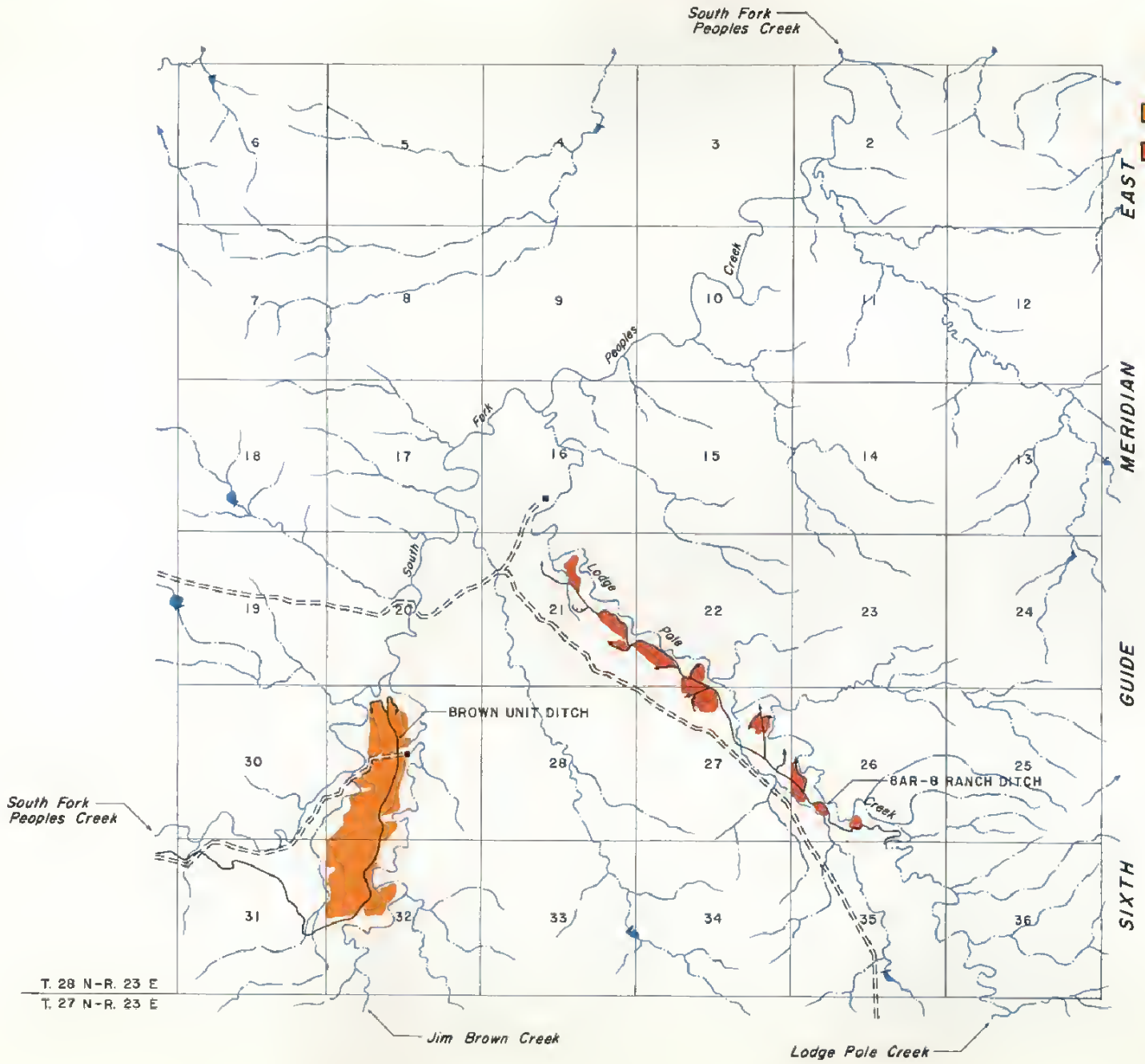

SEVENTH STANDARD PARALLEL NORTH
BELKNAP MERIDIAN
GUIDE
FORT
LEGEND
Private Irrigation
Revey Creek
Lewis Creek
Nicholson (Buff) Creek
Bear Creek
Lewis Creek
Gold Creek
Winters Creek
Hansen Coulee
Rattlesnake Creek
Honeymoon Creek
Logan Creek
West Fork Suction Creek
BLACK BUTTE
OLD DITCHES (NOT IN USE)
BAR-B DITCH
BAR-B DITCHES
McDONALD BASIN
JOHNSON BUTTE
SUCTION BUTTE
McDOUGAL BASIN
HANSEN BUTTE
RIEVE BUTTE
RATTLESNAKE BUTTE
MILLER DITCH & DIKE (NOT IN USE)
T. 28 N-R. 19 E
T. 27 N-R. 19 E
Twp. 28 North
Rge. 20 East

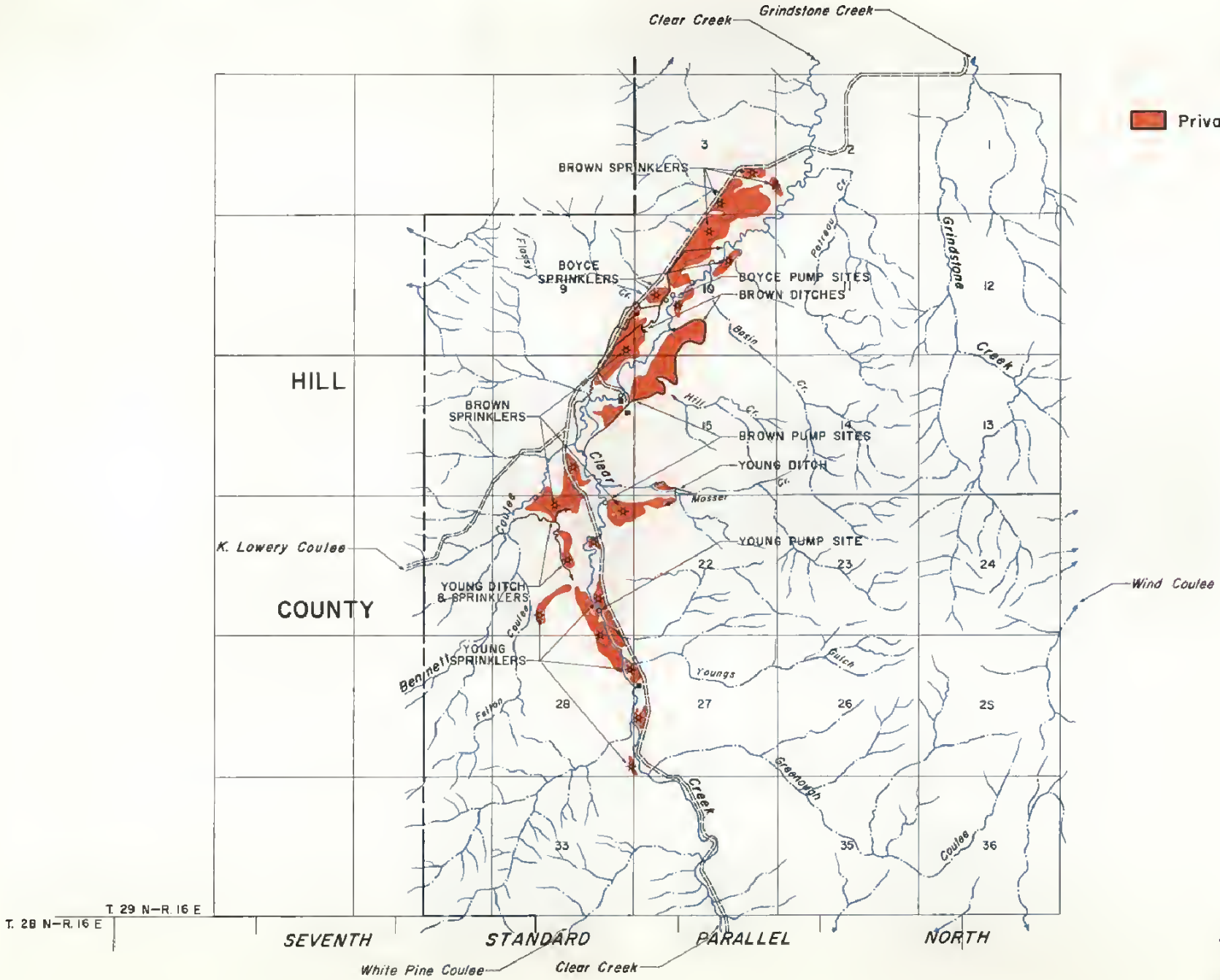


Twp. 28 North
Rge. 21 & 22 East



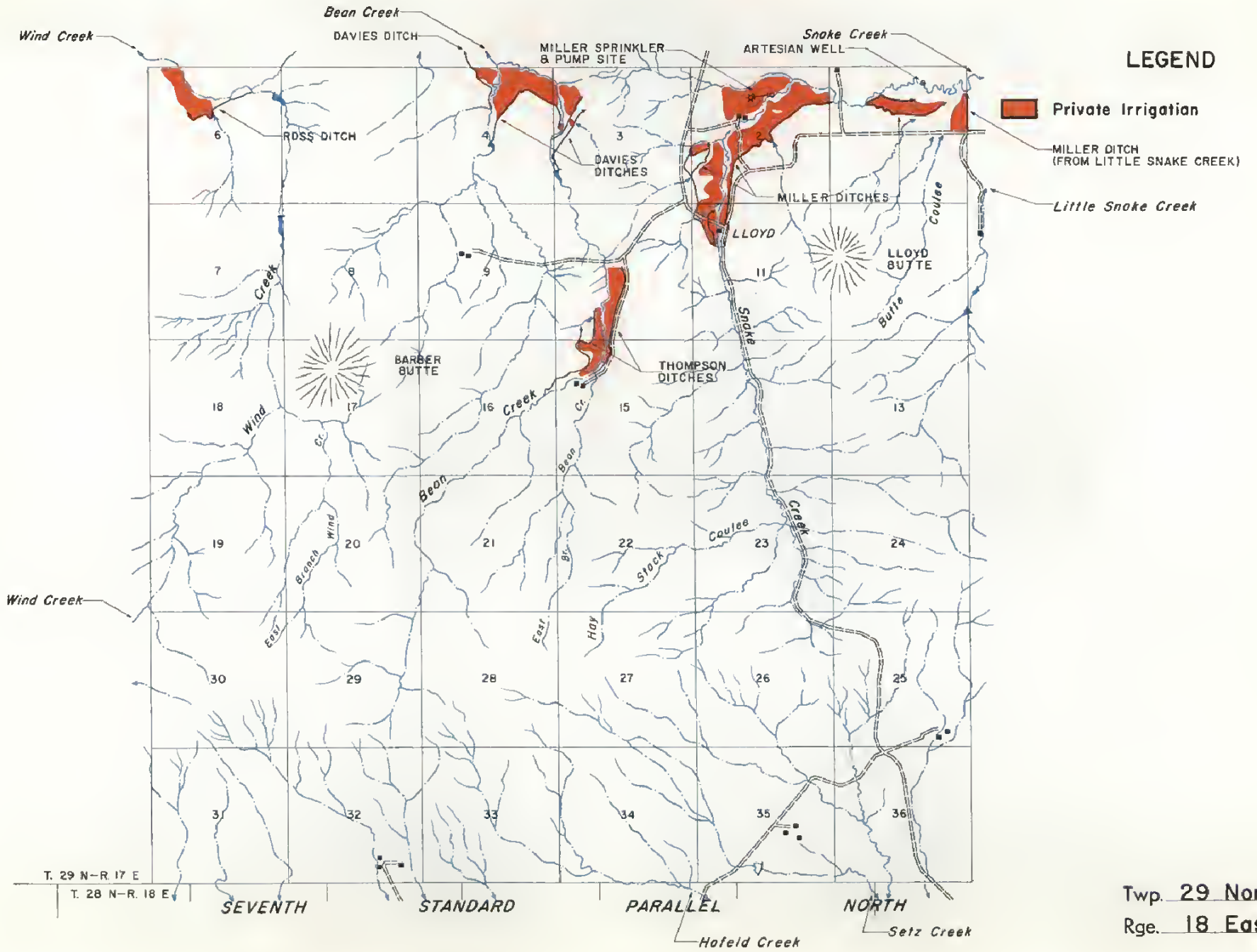
Twp. 28 North
Rge. 23 East


South Fork Peoples Creek
LEGEND
Fort Belknap Irrigation Project Brown Unit
Private Irrigation
EAST
MERIDIAN
GUIDE
SIXTH
BROWN UNIT DITCH
BAR-8 RANCH DITCH
South Fork Peoples Creek
Jim Brown Creek
Lodge Pole Creek
T. 28 N-R. 23 E
T. 27 N-R. 23 E
Twp. 28 North
Rge. 24 East

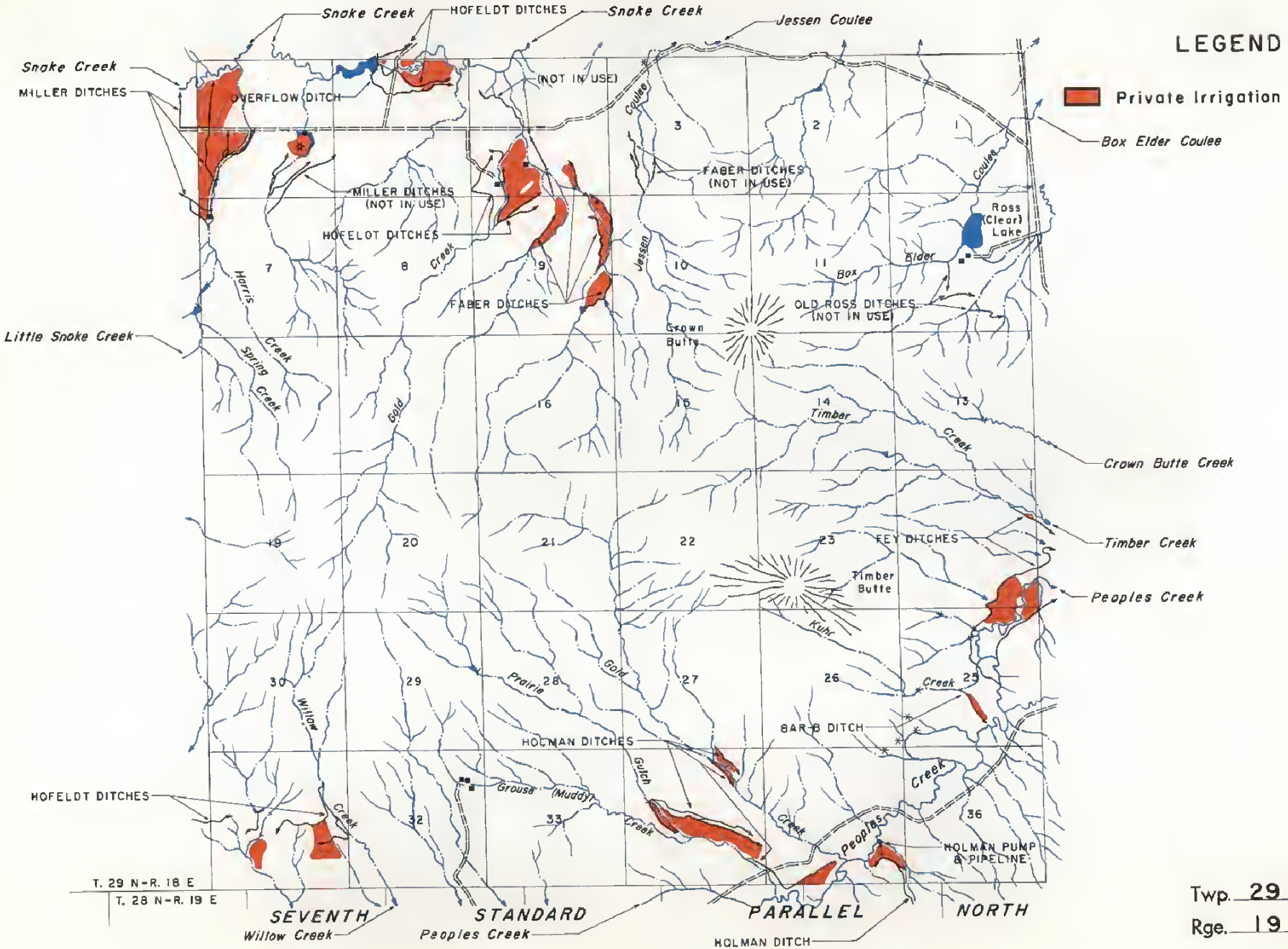


Twp. 29 North

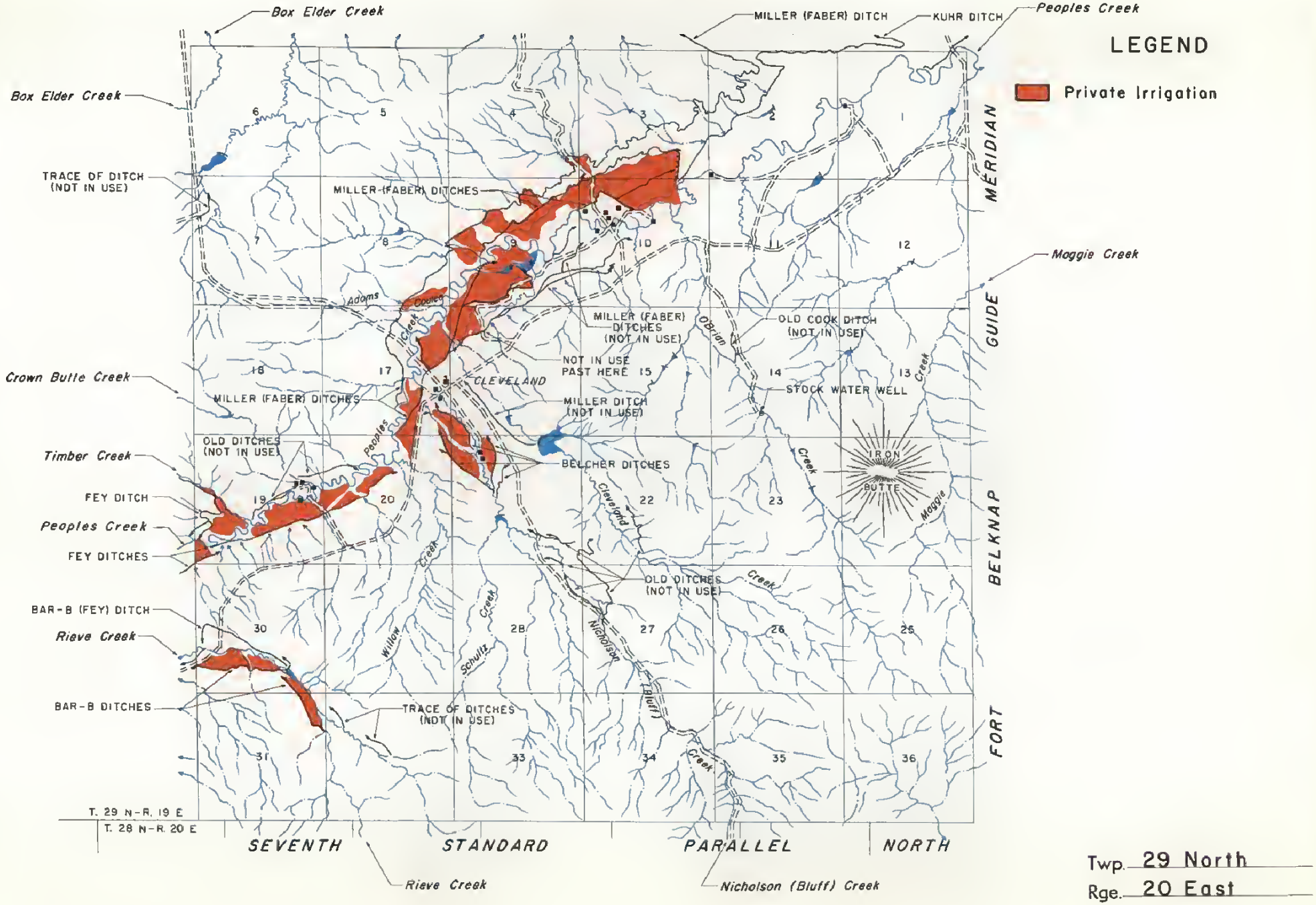
Rge. 17 East



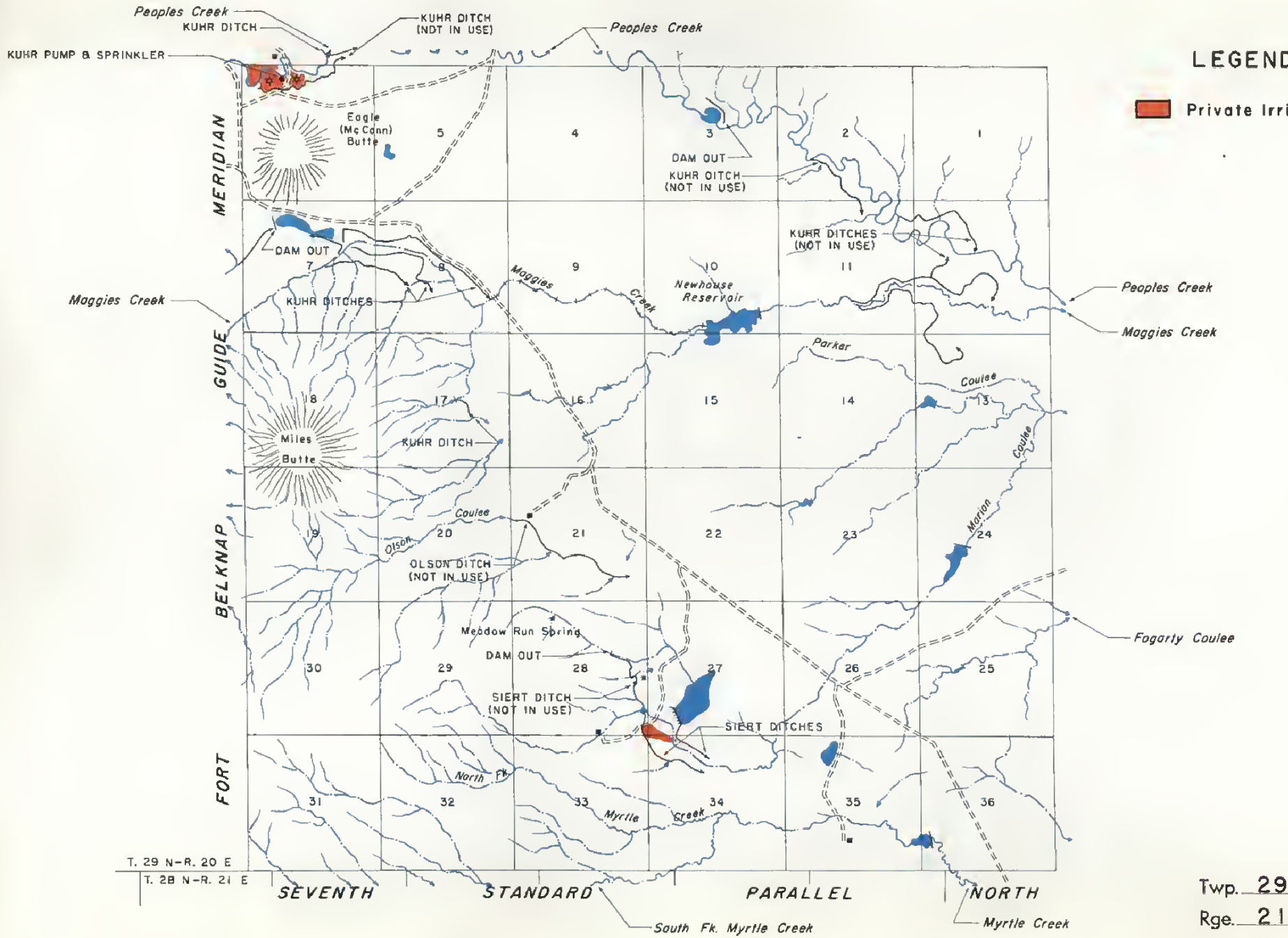
Twp. 29 North
Rge. 18 East



Twp. 29 North
Rge. 19 East



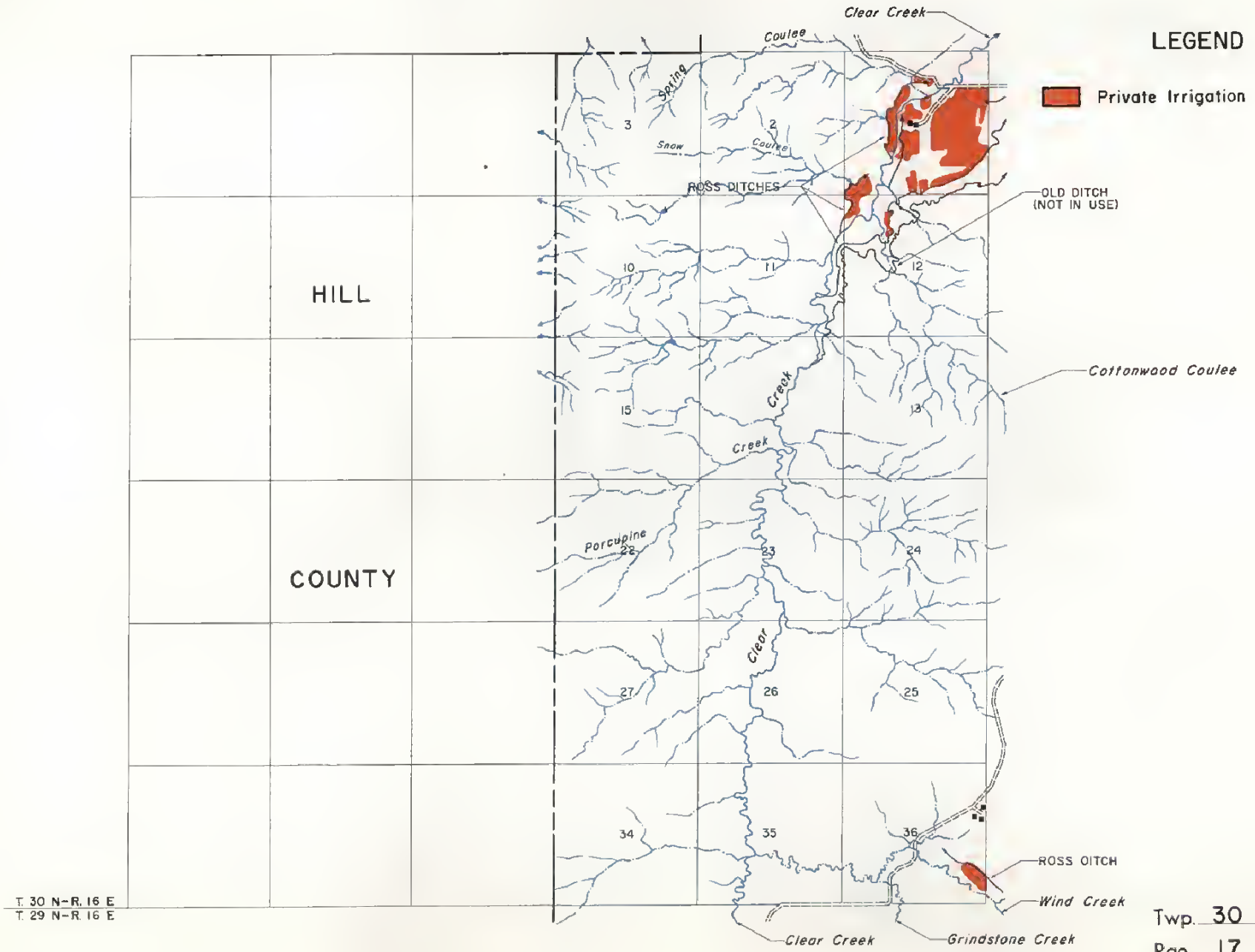
Twp. 29 North
Rge. 20 East

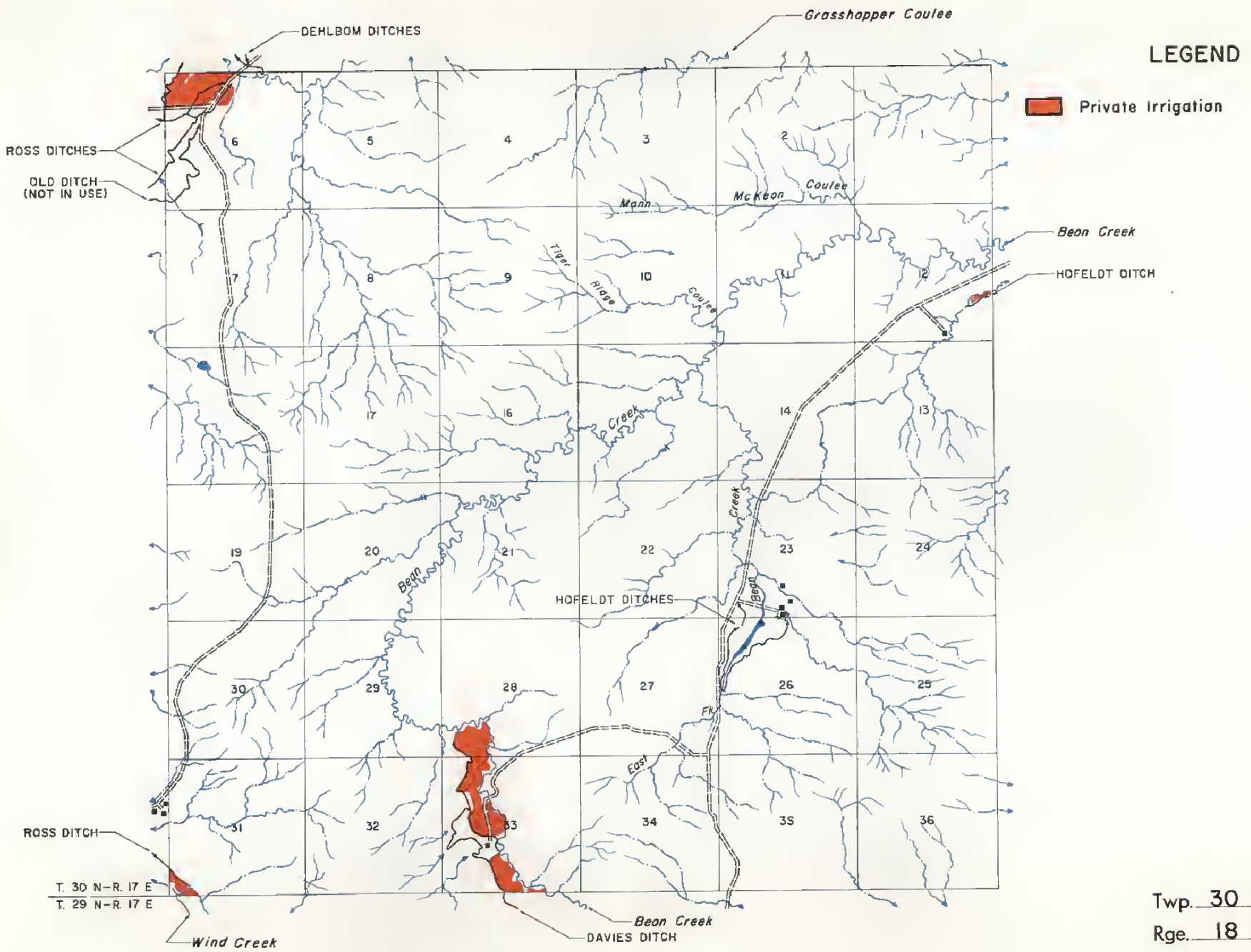


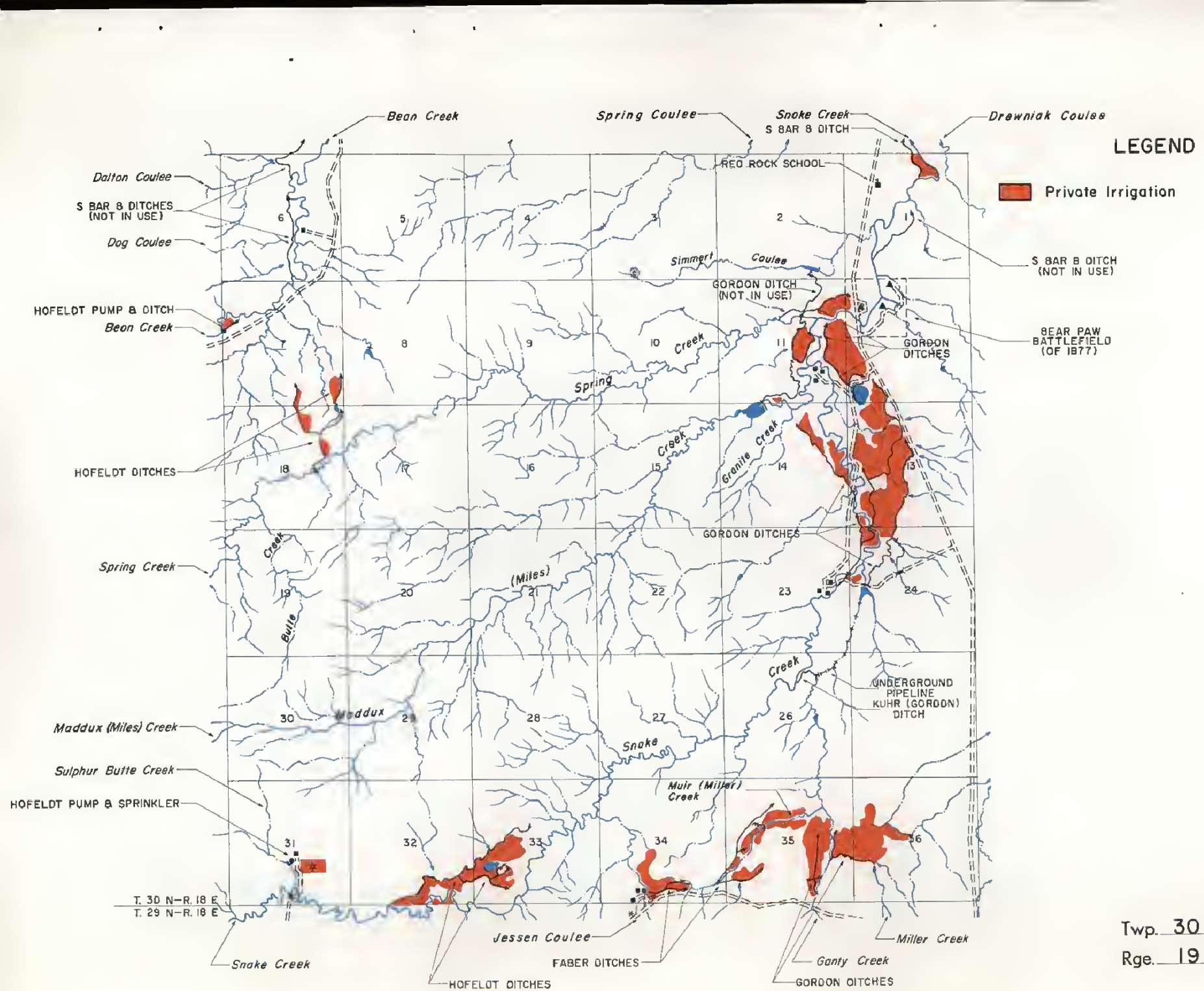
LEGEND

Private Irrigation

Twp. 29 North
Rge. 21 East

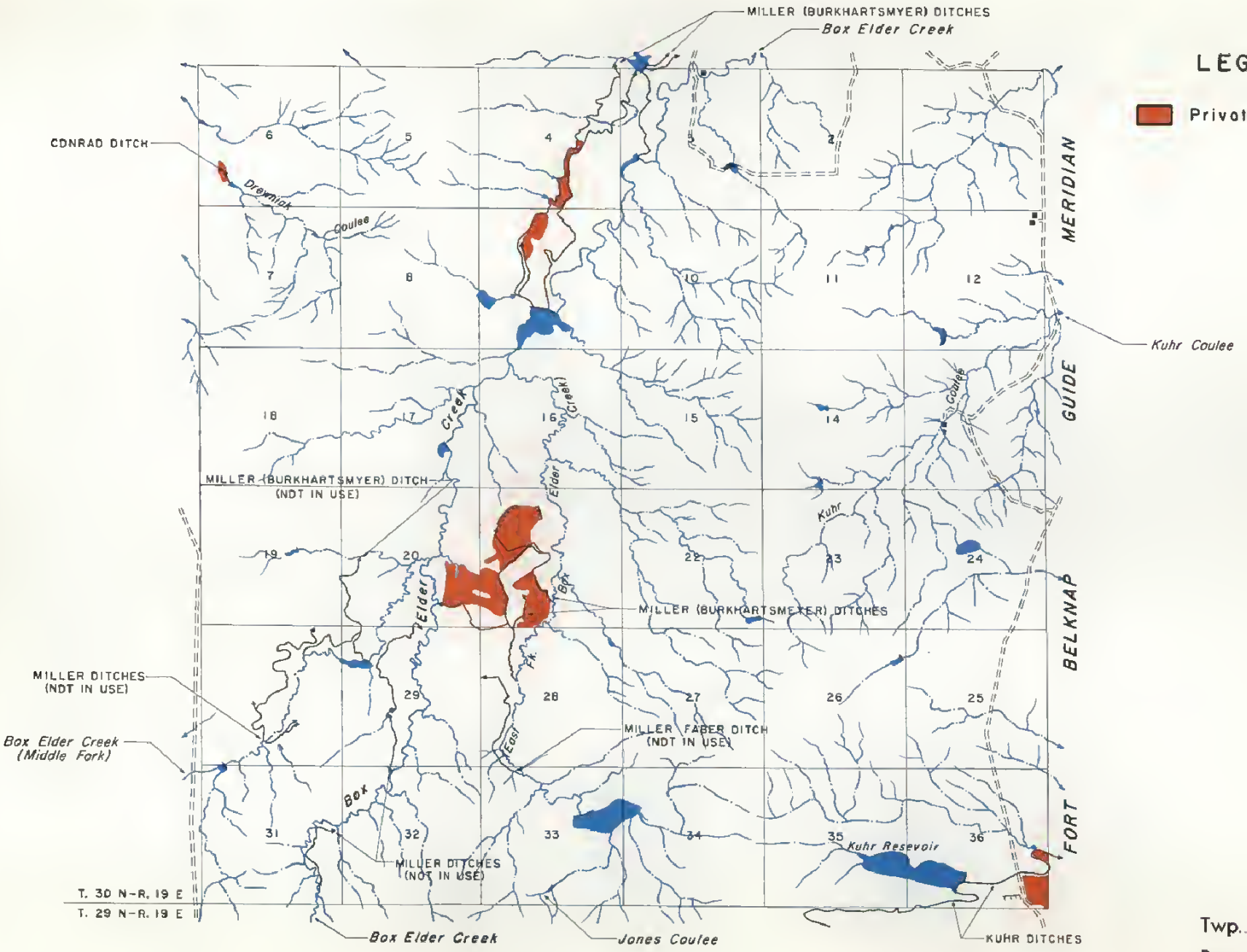

LEGEND
Private Irrigation
Clear Creek
Coulee
Spring
Snow
Coulee
ROSS DITCHES
OLD DITCH
(NOT IN USE)
Cottonwood Coulee
Creek
Creek
Porcupine
Clear
ROSS DITCH
Wind Creek
Clear Creek
Grindstone Creek
HILL
COUNTY
3
2
10
11
12
15
13
22
23
24
27
26
25
34
35
36
T. 30 N-R. 16 E
T. 29 N-R. 16 E
Twp. 30 North
Rge. 17 East


Grasshopper Coulee
DEHLBOM DITCHES
ROSS DITCHES
OLD DITCH (NOT IN USE)
Mann
McKeon
Coulee
Beon Creek
HOFELDT DITCH
Tiger Ridge Coulee
Creek
Bean
HOFELDT DITCHES
East Fk
ROSS DITCH
T. 30 N–R. 17 E
T. 29 N–R. 17 E
Wind Creek
Beon Creek
DAVIES DITCH
LEGEND
Private Irrigation
Twp. 30 North
Rge. 18 East



Twp. 30 North

Rge. 19 East

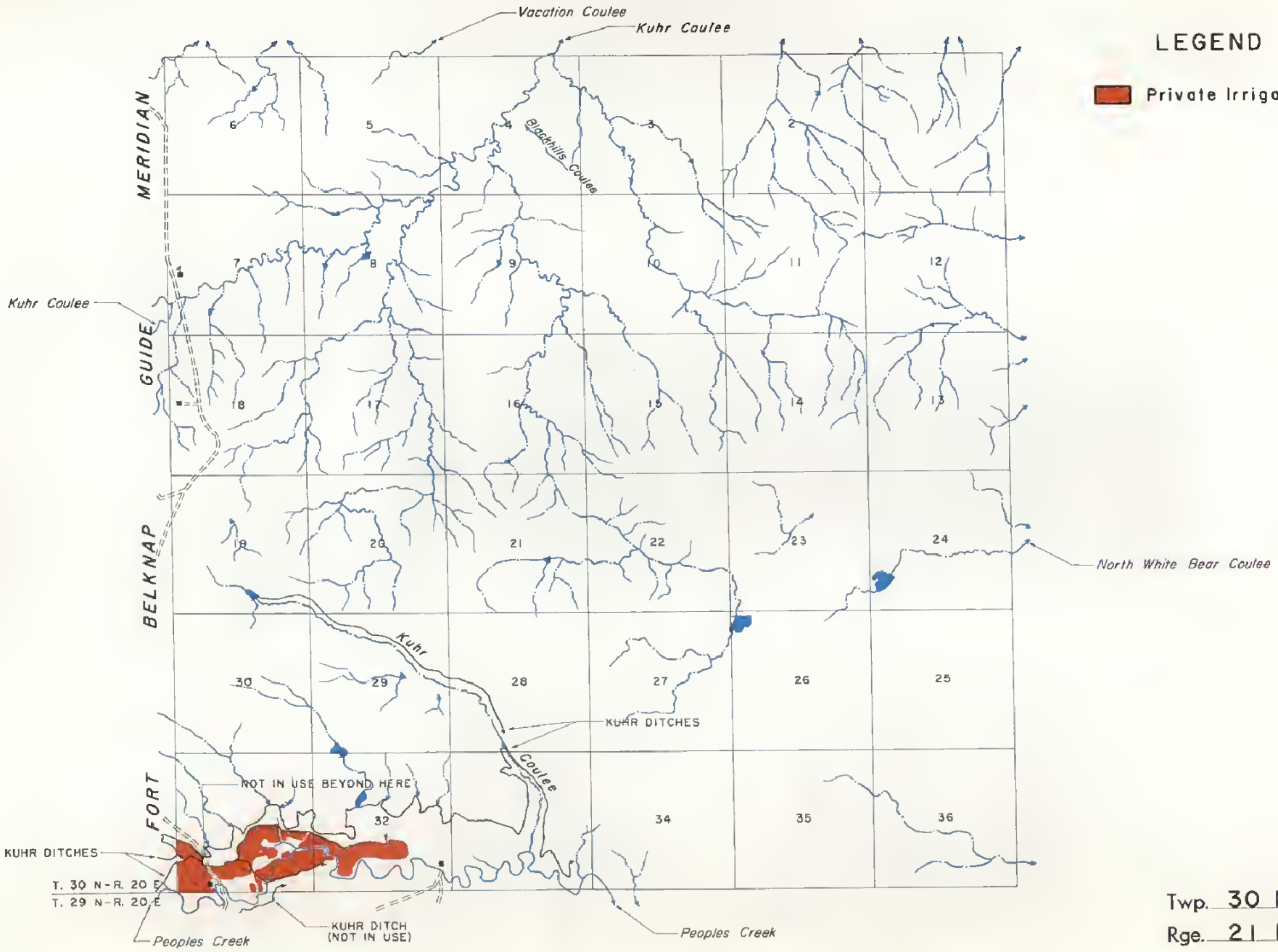


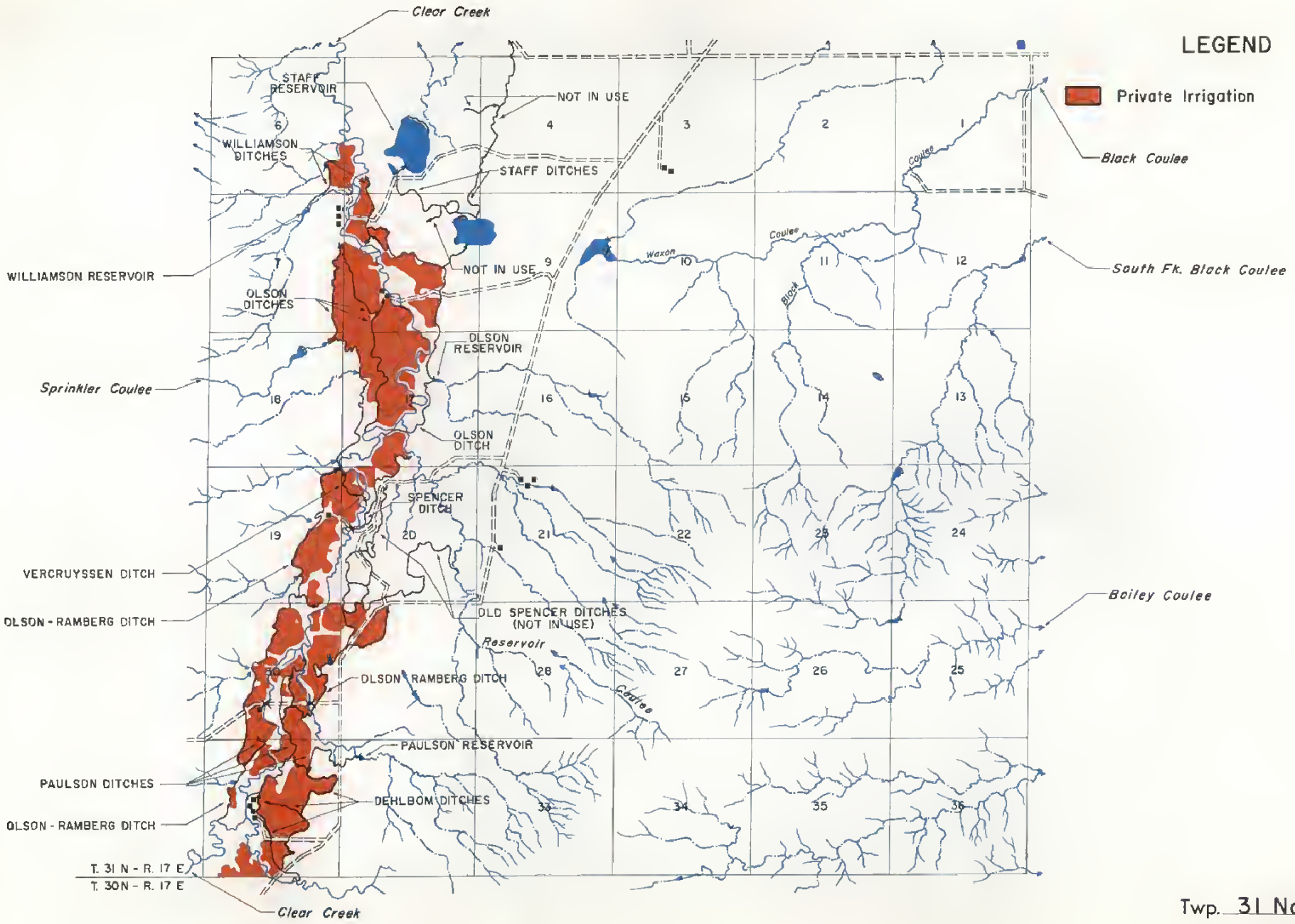
LEGEND

Private Irrigation

Twp. 30 North

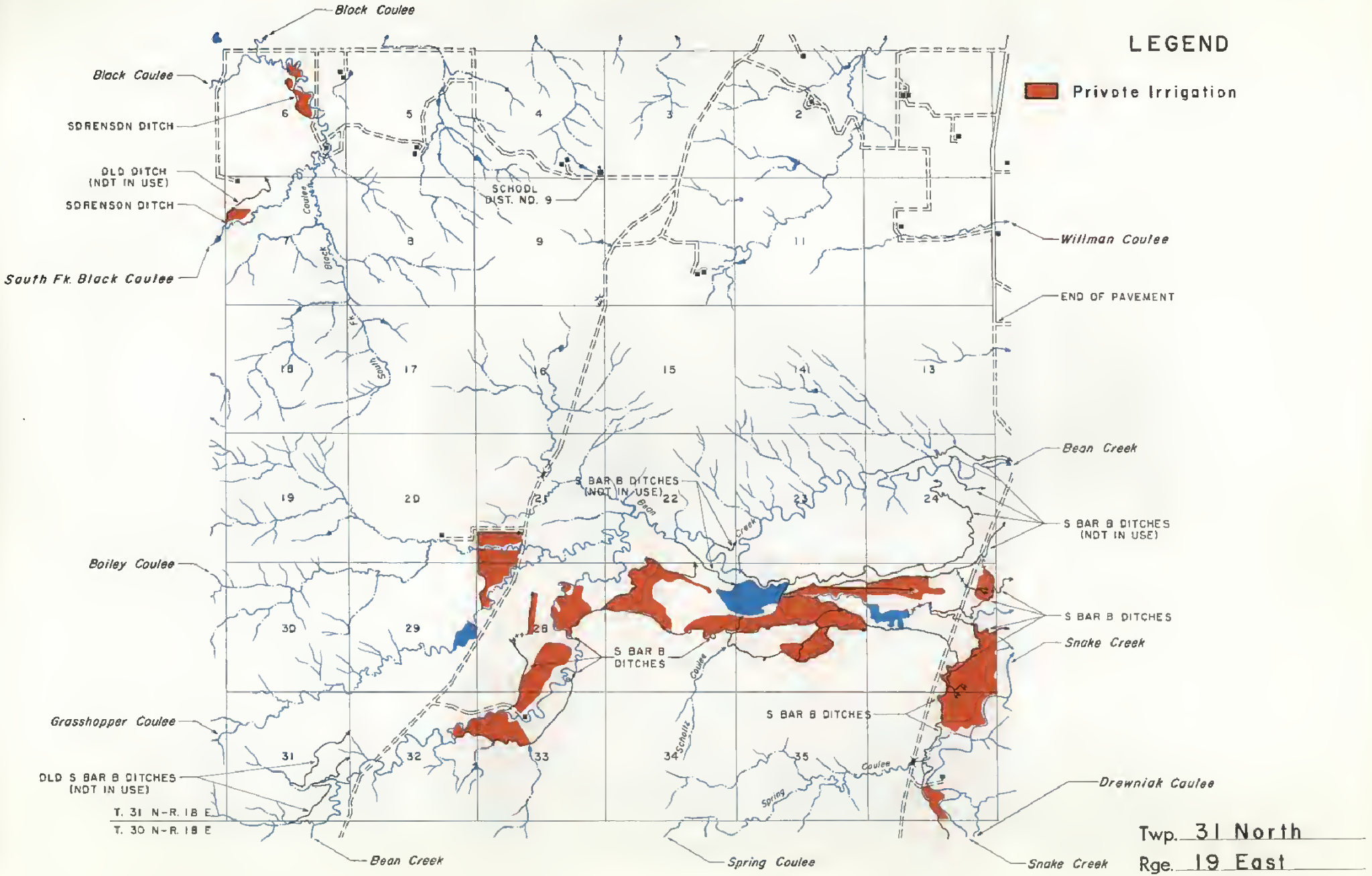
Rge. 20 East

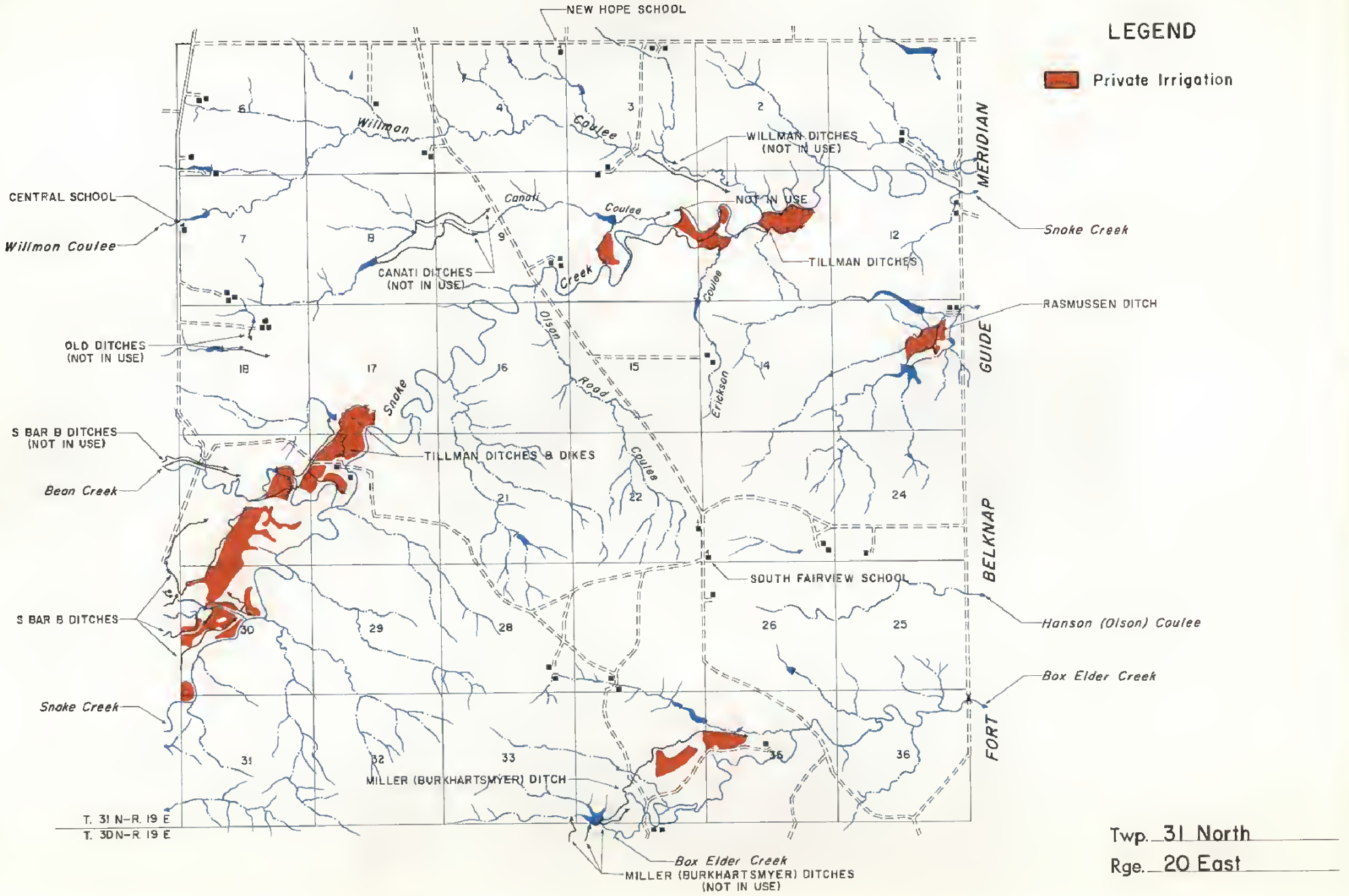

Vacation Coulee
Kuhr Coulee
MERIDIAN
Blackhills Coulee
Kuhr Coulee
GUIDE
BELKNAP
North White Bear Coulee
Kuhr
KUHR DITCHES
Coulee
FORT
NOT IN USE BEYOND HERE
KUHR DITCHES
T. 30 N-R. 20 E.
T. 29 N-R. 20 E.
Peoples Creek
KUHR DITCH
(NOT IN USE)
Peoples Creek
LEGEND
Private Irrigation
Twp. 30 North
Rge. 21 East

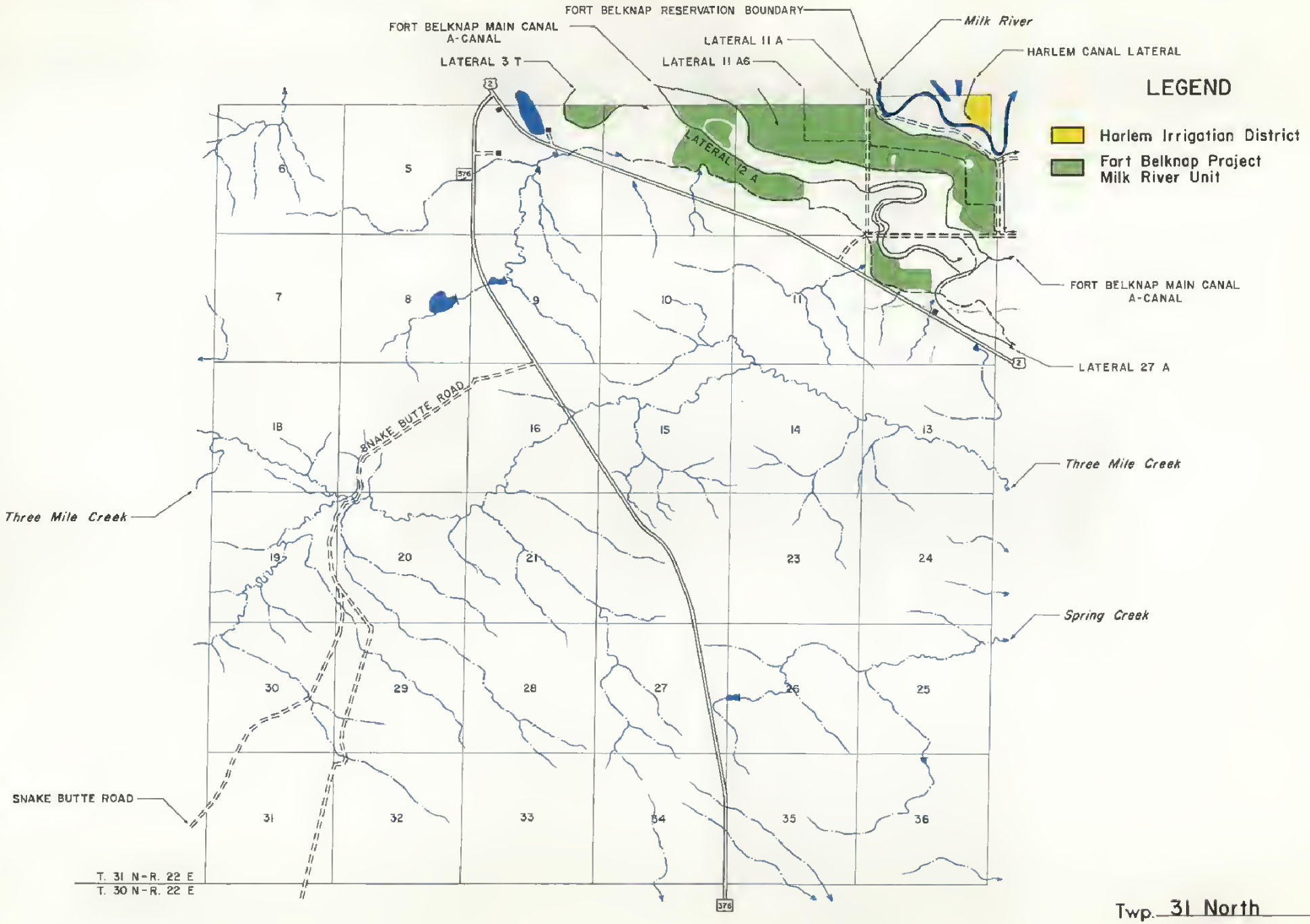


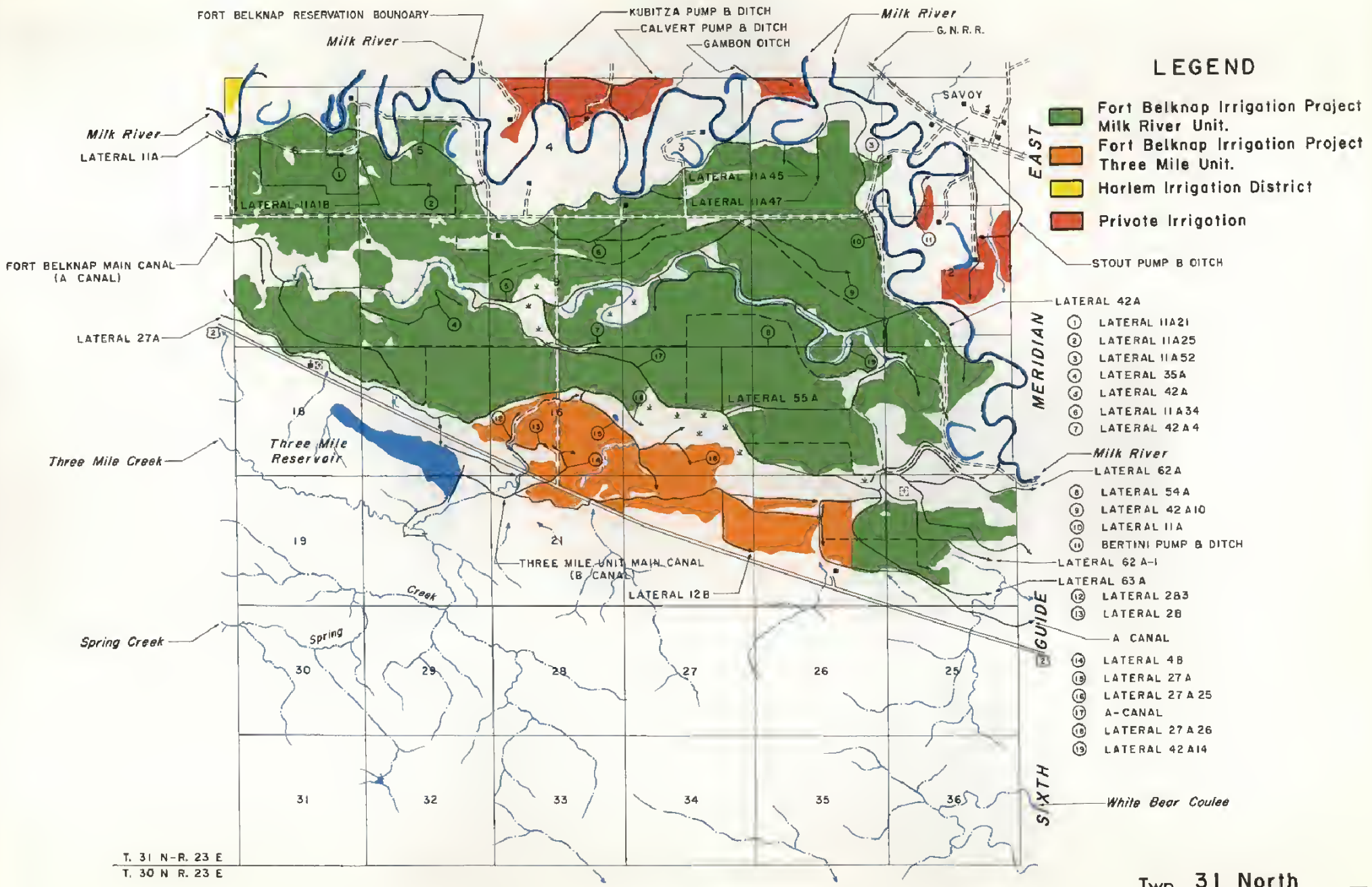
Twp. 31 North

Rge. 18 East

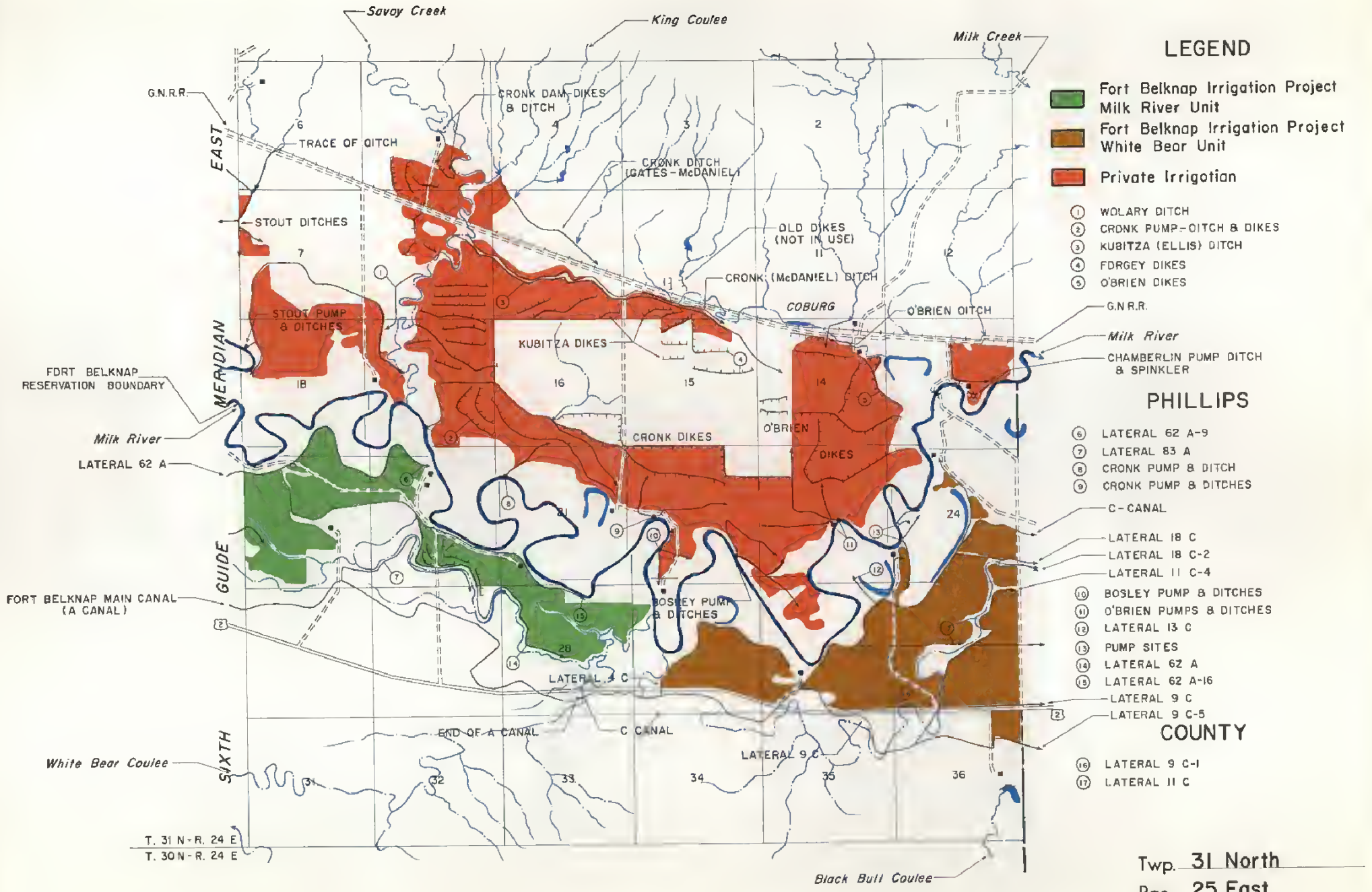

Block Coulee
Block Coulee
SORENSON DITCH
OLD DITCH (NOT IN USE)
SORENSON DITCH
South Fk. Block Coulee
SCHOOL DIST. NO. 9
Willman Coulee
END OF PAVEMENT
Bean Creek
S BAR B DITCHES (NOT IN USE)
S BAR B DITCHES (NOT IN USE)
Boiley Coulee
S BAR B DITCHES
Snake Creek
S BAR B DITCHES
Grasshopper Coulee
S BAR B DITCHES
OLD S BAR B DITCHES (NOT IN USE)
Drewniak Coulee
T. 31 N-R. 18 E.
T. 30 N-R. 18 E.
Bean Creek
Spring Coulee
Snake Creek
LEGEND
Private Irrigation
Twp. 31 North
Rge. 19 East

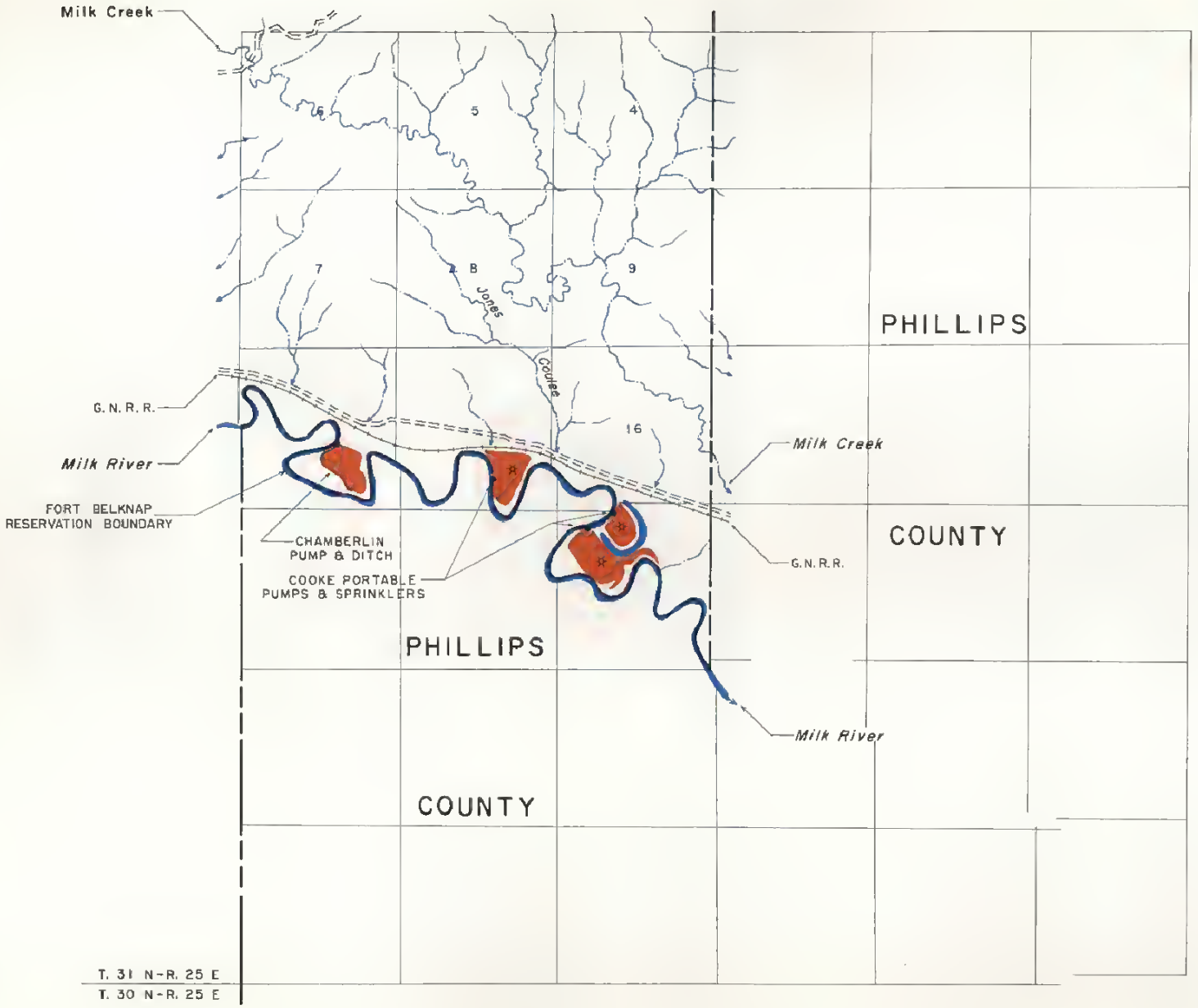

NEW HOPE SCHOOL
LEGEND
Private Irrigation
Willmon
Coulee
WILLMAN DITCHES (NOT IN USE)
MERIDIAN
CENTRAL SCHOOL
Willmon Coulee
Canati
Coulee
NOT IN USE
Snoke Creek
TILLMAN DITCHES
CANATI DITCHES (NOT IN USE)
Creek
Coulee
RASMUSSEN DITCH
Olson
OLD DITCHES (NOT IN USE)
GUIDE
Snoke
Road
Erickson
S BAR B DITCHES (NOT IN USE)
TILLMAN DITCHES & DIKES
Bean Creek
Coulee
BELKNAP
SOUTH FAIRVIEW SCHOOL
S BAR B DITCHES
Hanson (Olson) Coulee
Box Elder Creek
Snoke Creek
FORT
MILLER (BURKHARTSMYER) DITCH
T. 31 N-R. 19 E
T. 30N-R. 19 E
Box Elder Creek
MILLER (BURKHARTSMYER) DITCHES (NOT IN USE)
Twp. 31 North
Rge. 20 East


FORT BELKNAP RESERVATION BOUNDARY
FORT BELKNAP MAIN CANAL A-CANAL
LATERAL 3 T
LATERAL 11 A
LATERAL 11 A6
Milk River
HARLEM CANAL LATERAL
LEGEND
Harlem Irrigation District
Fort Belknap Project Milk River Unit
LATERAL 12 A
FORT BELKNAP MAIN CANAL A-CANAL
LATERAL 27 A
SNAKE BUTTE ROAD
Three Mile Creek
Three Mile Creek
Spring Creek
SNAKE BUTTE ROAD
T. 31 N-R. 22 E
T. 30 N-R. 22 E
Twp. 31 North
Rge. 23 East



Twp. 31 North
Rge. 24 East

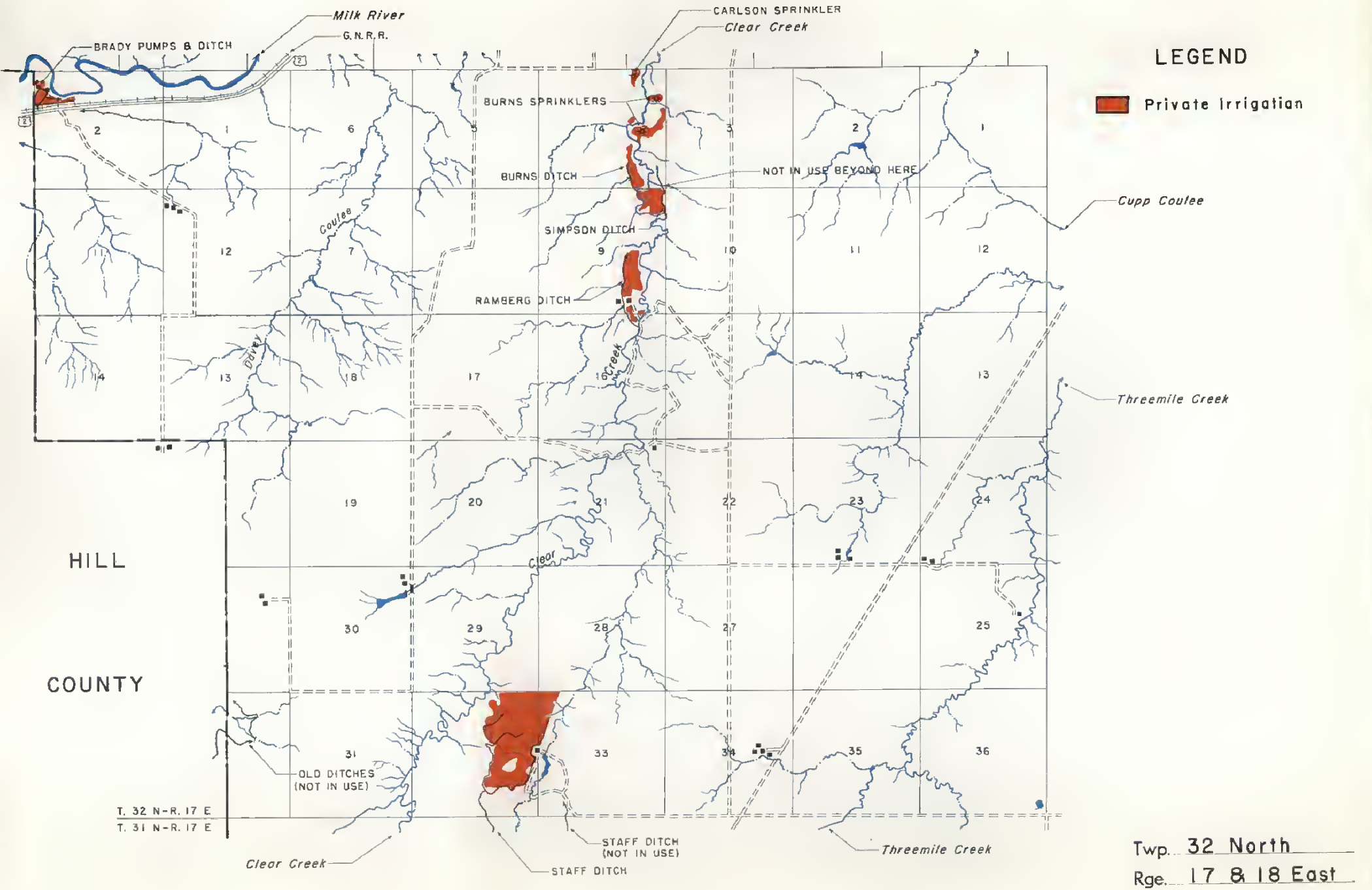

Savoy Creek
King Coulee
Milk Creek
G.N.R.R.
CRONK DAM-DIKES & DITCH
TRACE OF DITCH
CRONK DITCH (GATES-McDANIEL)
EAST
STOUT DITCHES
OLD DIKES (NOT IN USE)
CRONK (McDANIEL) DITCH
COBURG
O'BRIEN DITCH
G.N.R.R.
Milk River
CHAMBERLIN PUMP DITCH & SPINKLER
STOUT PUMP & DITCHES
KUBITZA DIKES
MERIDIAN
FORT BELKNAP RESERVATION BOUNDARY
Milk River
LATERAL 62 A
CRONK DIKES
O'BRIEN DIKES
C-CANAL
LATERAL 18 C
LATERAL 18 C-2
LATERAL 11 C-4
GUIDE
FORT BELKNAP MAIN CANAL (A CANAL)
BOSLEY PUMP & DITCHES
LATERAL 13 C
END OF A CANAL
C CANAL
LATERAL 9 C
LATERAL 9 C-5
SIXTH
White Bear Coulee
LATERAL 9 C-1
LATERAL 11 C
T. 31 N - R. 24 E
T. 30 N - R. 24 E
Black Bull Coulee
LEGEND
Fort Belknap Irrigation Project Milk River Unit
Fort Belknap Irrigation Project White Bear Unit
Private Irrigation
1 WOLARY DITCH
2 CRONK PUMP-DITCH & DIKES
3 KUBITZA (ELLIS) DITCH
4 FORGEY DIKES
5 O'BRIEN DIKES
PHILLIPS
6 LATERAL 62 A-9
7 LATERAL 83 A
8 CRONK PUMP & DITCH
9 CRONK PUMP & DITCHES
10 BOSLEY PUMP & DITCHES
11 O'BRIEN PUMPS & DITCHES
12 LATERAL 13 C
13 PUMP SITES
14 LATERAL 62 A
15 LATERAL 62 A-16
16 LATERAL 9 C-1
17 LATERAL 11 C
COUNTY
Twp. 31 North
Rge. 25 East

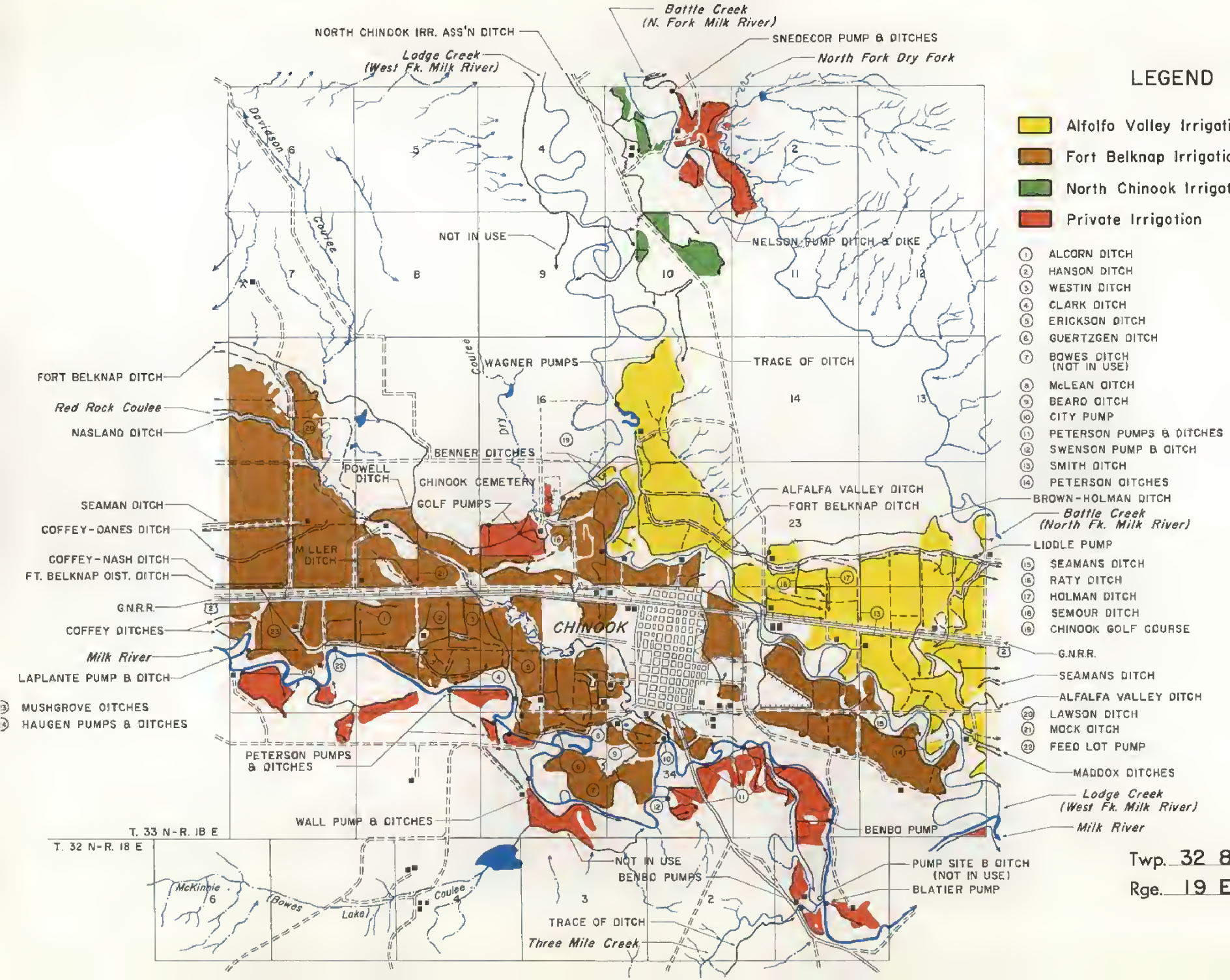


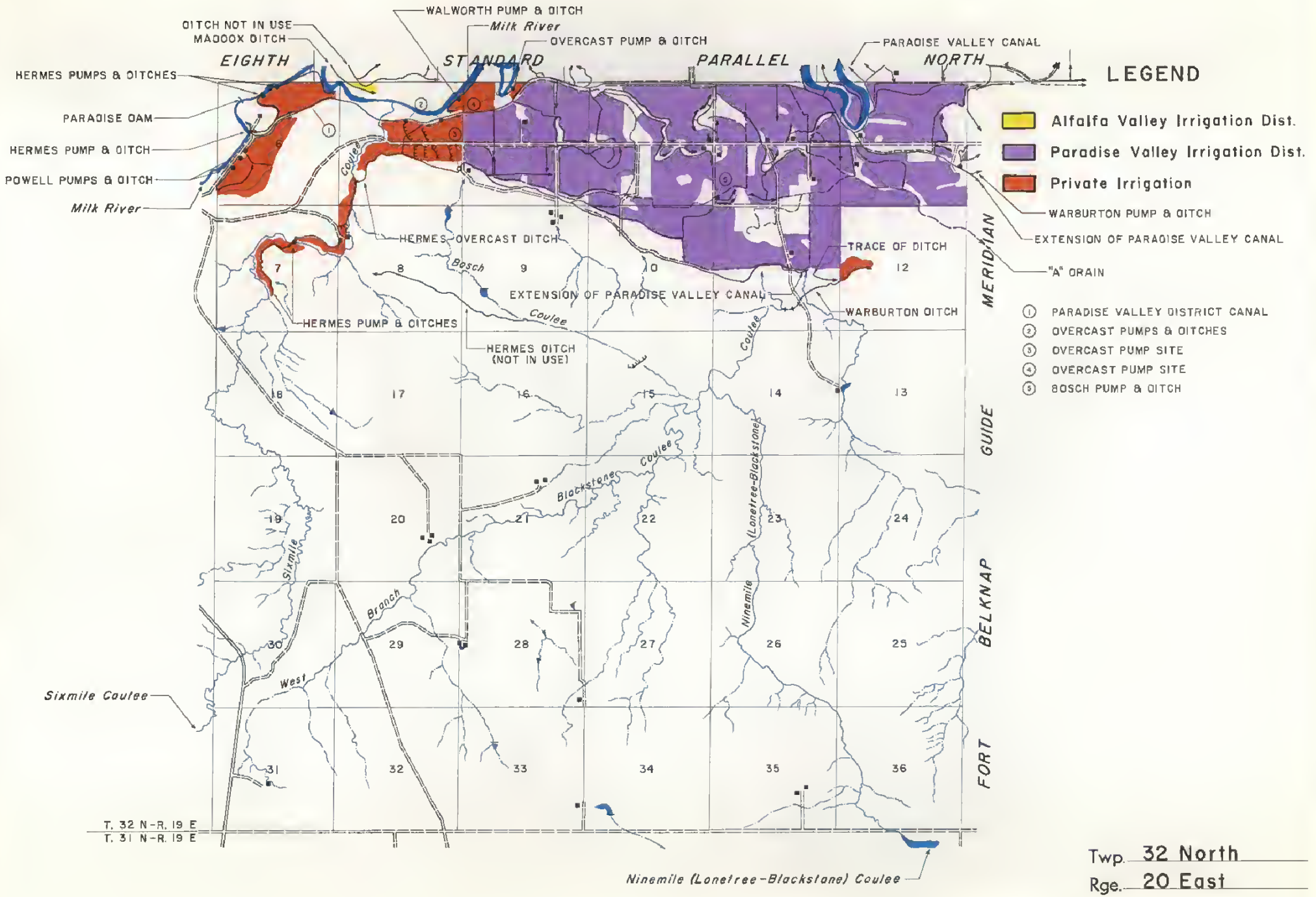
LEGEND

Private Irrigation

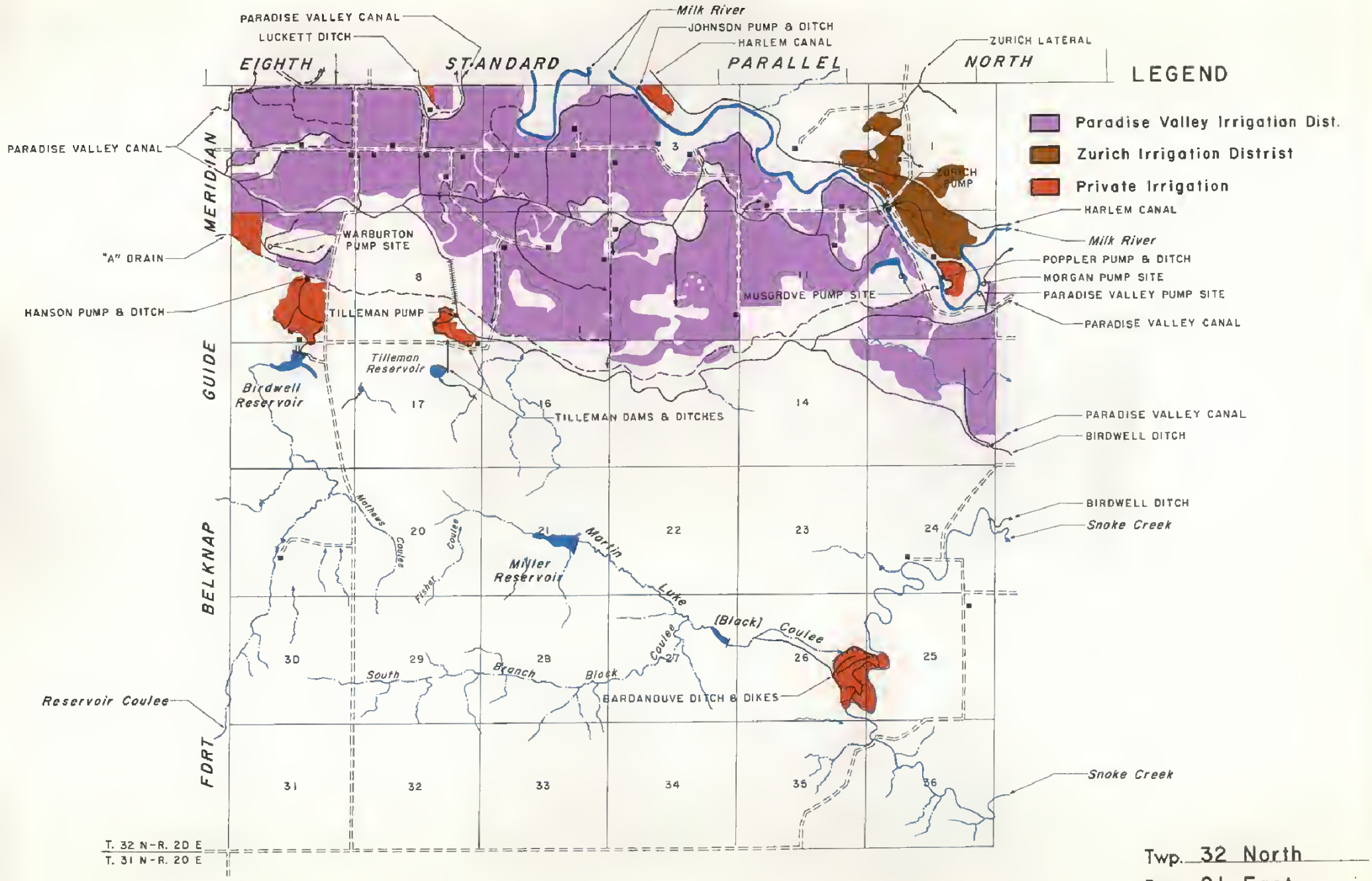
Twp. 31 North
Rge. 26 East


Milk River
G.N.R.R.
BRADY PUMPS & DITCH
CARLSON SPRINKLER
Clear Creek
BURNS SPRINKLERS
BURNS DITCH
NOT IN USE BEYOND HERE
SIMPSON DITCH
RAMBERG DITCH
Cupp Coulee
Threemile Creek
Coulee
Dairy
Creek
Clear
HILL
COUNTY
OLD DITCHES
(NOT IN USE)
T. 32 N-R. 17 E
T. 31 N-R. 17 E
Clear Creek
STAFF DITCH
(NOT IN USE)
STAFF DITCH
Threemile Creek
LEGEND
Private Irrigation
Twp. 32 North
Rge. 17 & 18 East

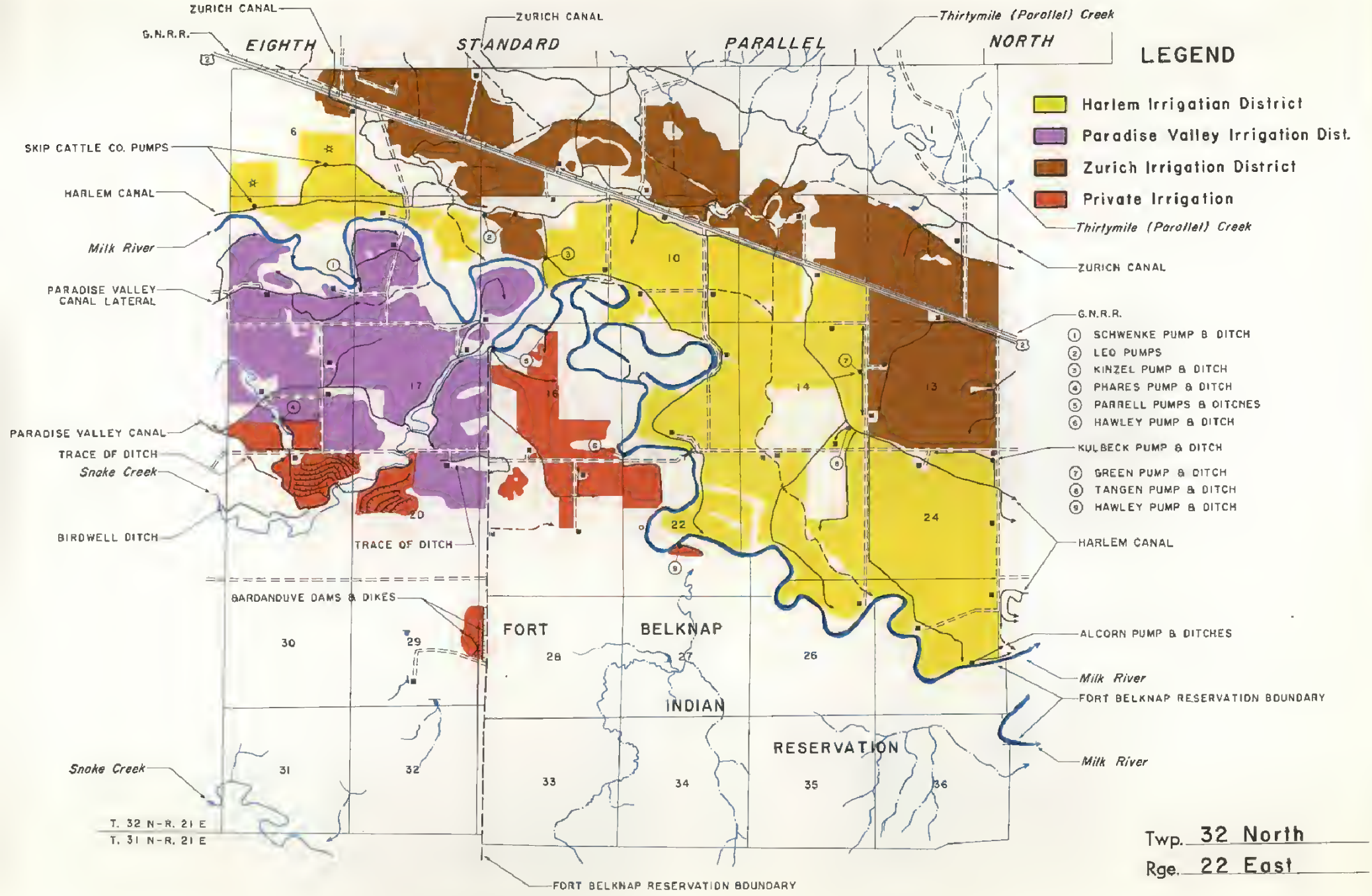

NORTH CHINOOK IRR. ASS'N DITCH
Battle Creek (N. Fork Milk River)
SNEDECOR PUMP & DITCHES
Lodge Creek (West Fk. Milk River)
North Fork Dry Fork
Davidson Coulee
NOT IN USE
NELSON PUMP DITCH & DIKE
WAGNER PUMPS
TRACE OF DITCH
Dry Coulee
FORT BELKNAP DITCH
Red Rock Coulee
NASLAND DITCH
BENNER DITCHES
POWELL DITCH
CHINOOK CEMETERY
GOLF PUMPS
ALFALFA VALLEY DITCH
FORT BELKNAP DITCH
BROWN-HOLMAN DITCH
Battle Creek (North Fk. Milk River)
LIDDLE PUMP
SEAMAN DITCH
COFFEY-DANES DITCH
COFFEY-NASH DITCH
FT. BELKNAP DIST. DITCH
MILLER DITCH
G.N.R.R.
COFFEY DITCHES
Milk River
LAPLANTE PUMP & DITCH
MUSHGROVE DITCHES
HAUGEN PUMPS & DITCHES
CHINOOK
SEAMANS DITCH
RATY DITCH
HOLMAN DITCH
SEMOUR DITCH
CHINOOK GOLF COURSE
G.N.R.R.
SEAMANS DITCH
ALFALFA VALLEY DITCH
LAWSON DITCH
MOCK DITCH
FEED LOT PUMP
MADDOX DITCHES
Lodge Creek (West Fk. Milk River)
Milk River
PETERSON PUMPS & DITCHES
WALL PUMP & DITCHES
BENBO PUMP
T. 33 N-R. 18 E
T. 32 N-R. 18 E
NOT IN USE
BENBO PUMPS
PUMP SITE B DITCH (NOT IN USE)
BLATIER PUMP
McKinnie Coulee
Bowes Lake
TRACE OF DITCH
Three Mile Creek
LEGEND
Alfolfo Valley Irrigation Dist.
Fort Belknap Irrigation District
North Chinook Irrigation Ass'n
Private Irrigation
1 ALCORN DITCH
2 HANSON DITCH
3 WESTIN DITCH
4 CLARK DITCH
5 ERICKSON DITCH
6 GUERTZGEN DITCH
7 BOWES DITCH (NOT IN USE)
8 McLEAN DITCH
9 BEARD DITCH
10 CITY PUMP
11 PETERSON PUMPS & DITCHES
12 SWENSON PUMP & DITCH
13 SMITH DITCH
14 PETERSON DITCHES
15 SEAMANS DITCH
16 RATY DITCH
17 HOLMAN DITCH
18 SEMOUR DITCH
19 CHINOOK GOLF COURSE
20 LAWSON DITCH
21 MOCK DITCH
22 FEED LOT PUMP
Twp. 32 & 33 North
Rge. 19 East

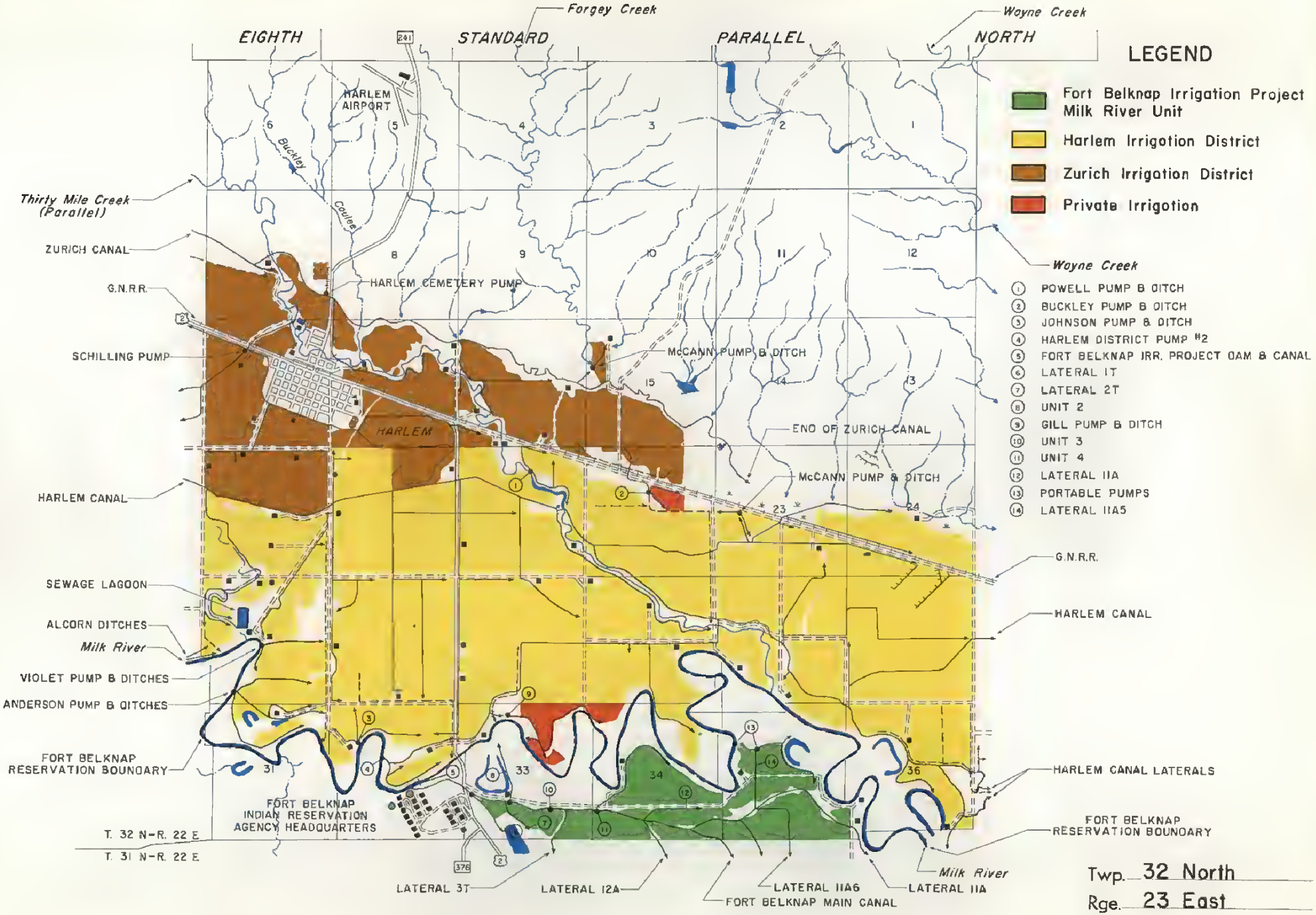


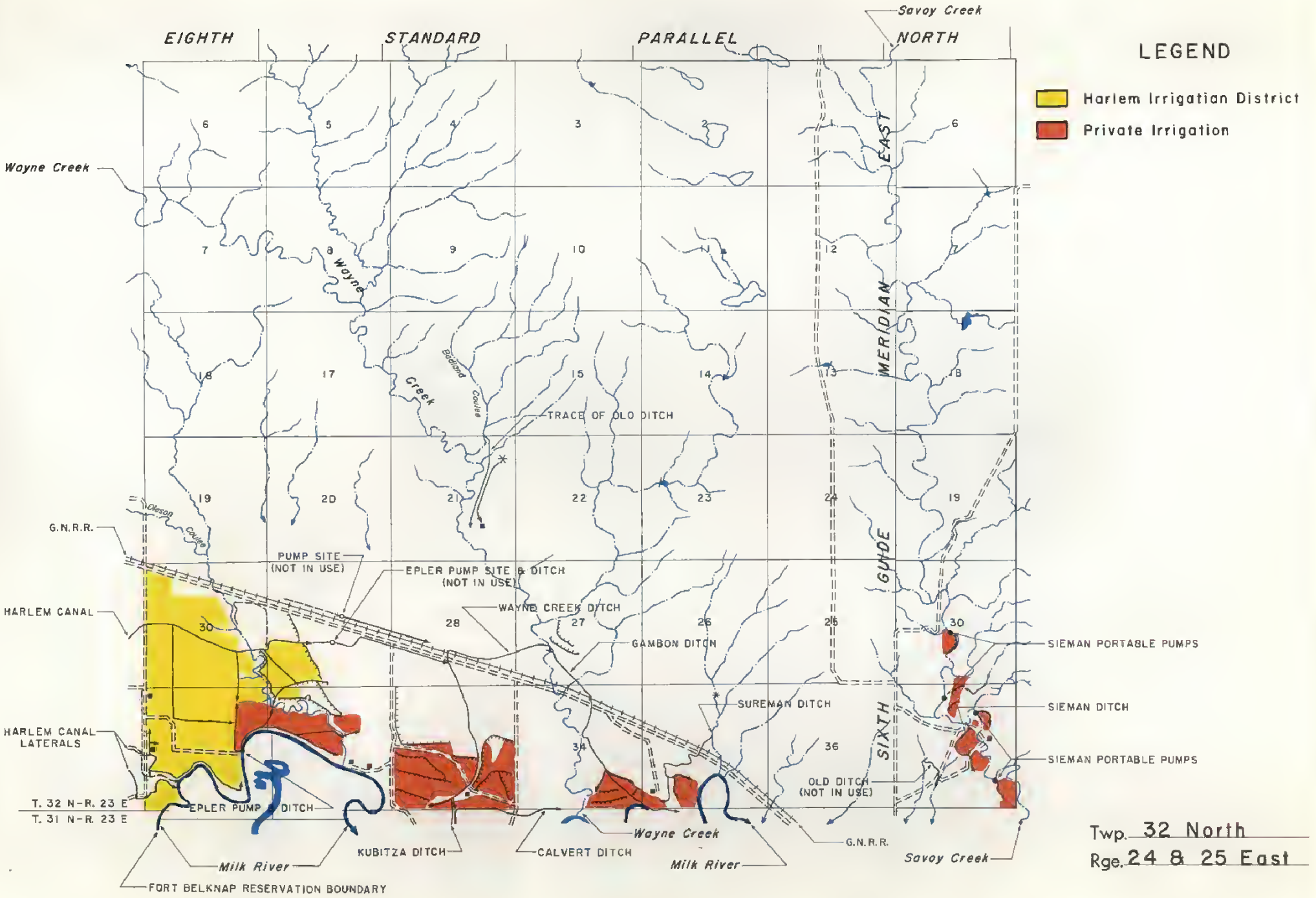
Twp. 32 North
Rge. 20 East

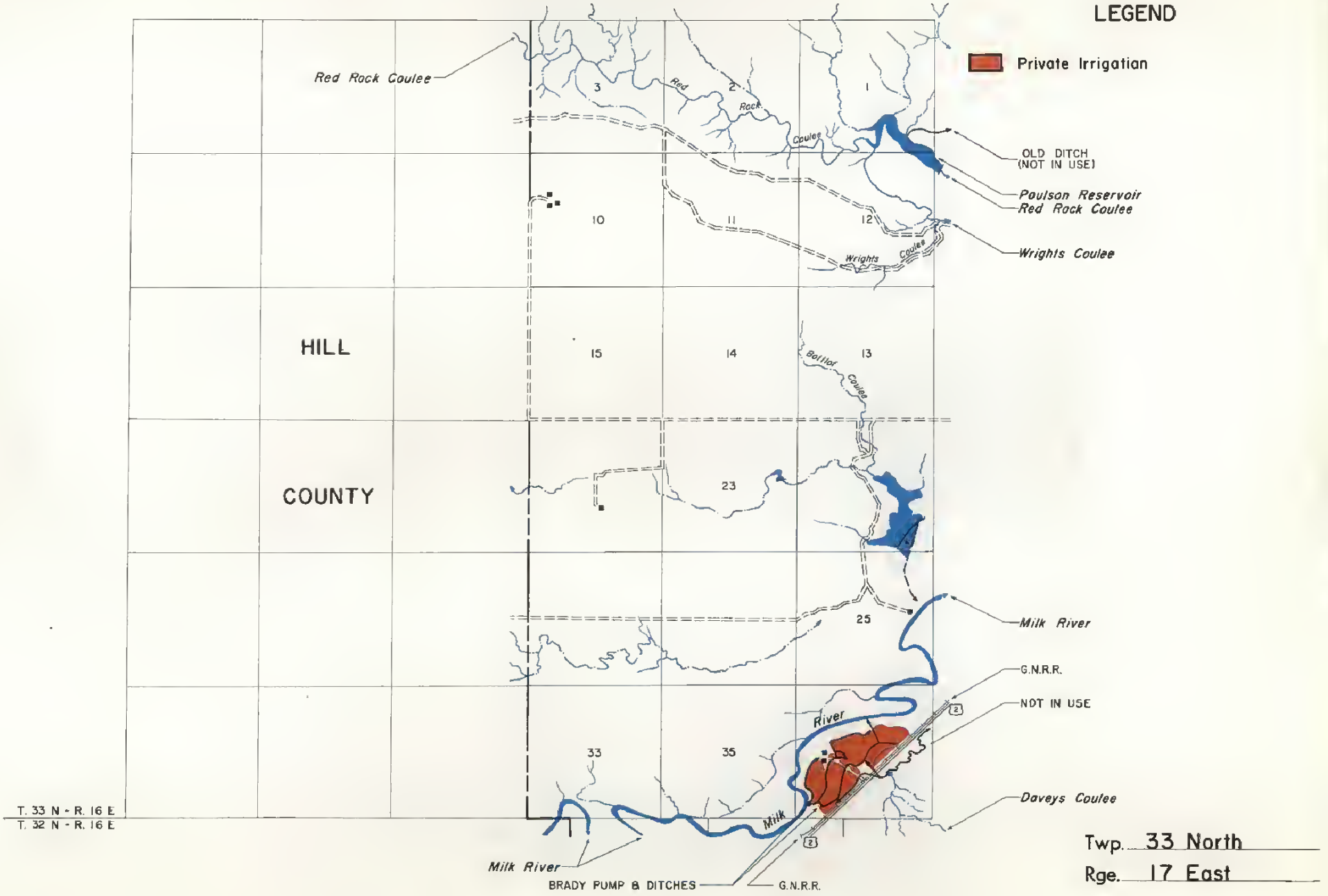


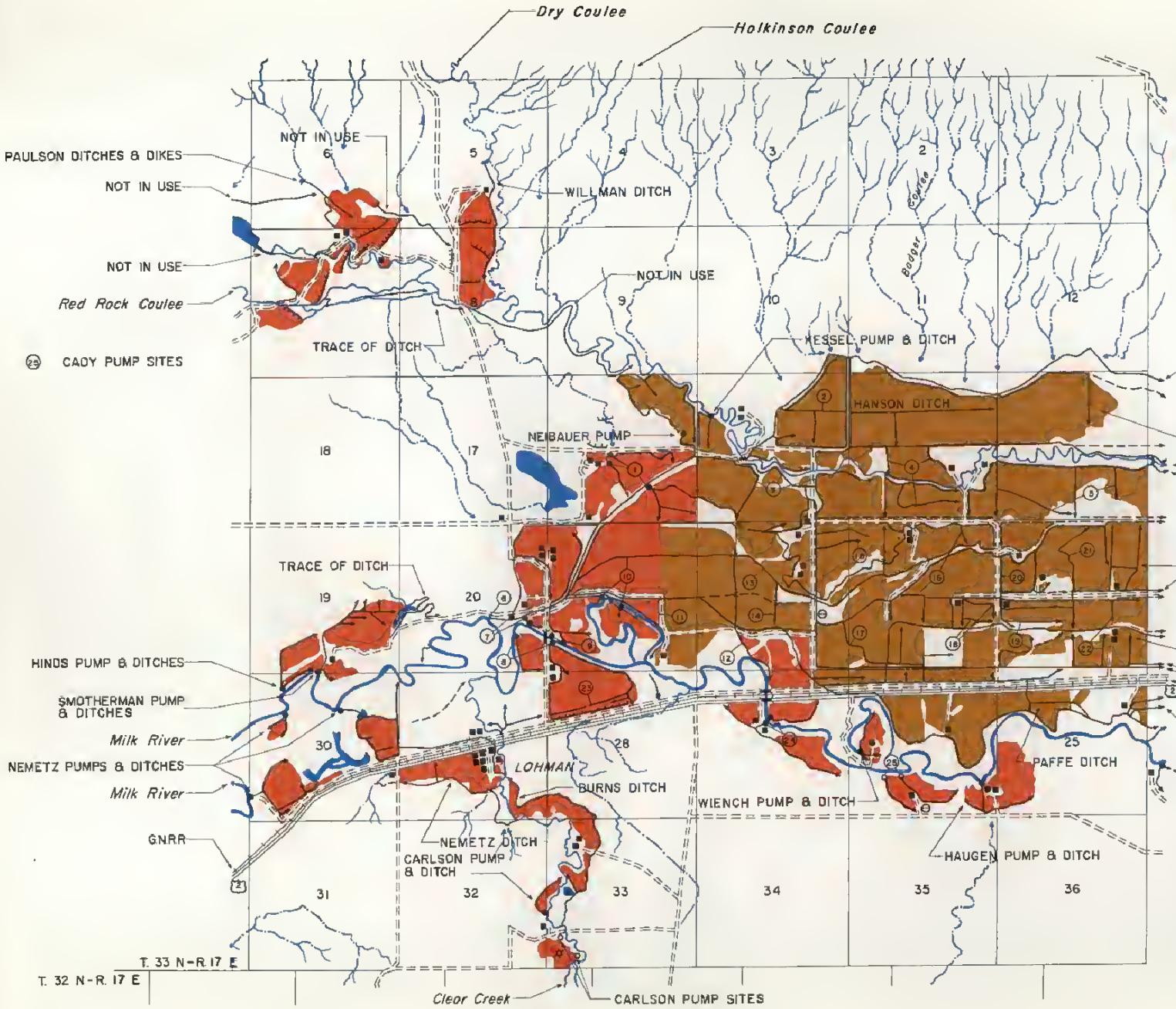
Twp. 32 North
Rge. 21 East


ZURICH CANAL
G.N.R.R.
EIGHTH STANDARD PARALLEL NORTH
ZURICH CANAL
Thirtymile (Parallel) Creek
SKIP CATTLE CO. PUMPS
HARLEM CANAL
Milk River
PARADISE VALLEY CANAL LATERAL
PARADISE VALLEY CANAL
TRACE OF DITCH
Snake Creek
BIRDWELL DITCH
TRACE OF DITCH
BARDANOUVE DAMS & DIKES
FORT BELKNAP INDIAN RESERVATION
Snake Creek
T. 32 N-R. 21 E
T. 31 N-R. 21 E
FORT BELKNAP RESERVATION BOUNDARY
LEGEND
Harlem Irrigation District
Paradise Valley Irrigation Dist.
Zurich Irrigation District
Private Irrigation
Thirtymile (Parallel) Creek
ZURICH CANAL
G.N.R.R.
1 SCHWENKE PUMP & DITCH
2 LEO PUMPS
3 KINZEL PUMP & DITCH
4 PHARES PUMP & DITCH
5 PARRELL PUMPS & DITCHES
6 HAWLEY PUMP & DITCH
KULBECK PUMP & DITCH
7 GREEN PUMP & DITCH
8 TANGEN PUMP & DITCH
9 HAWLEY PUMP & DITCH
HARLEM CANAL
ALCORN PUMP & DITCHES
Milk River
FORT BELKNAP RESERVATION BOUNDARY
Milk River
Twp. 32 North
Rge. 22 East


EIGHTH STANDARD PARALLEL NORTH
Forgey Creek
Wayne Creek
HARLEM AIRPORT
Buckley Coulee
Thirty Mile Creek (Parallel)
ZURICH CANAL
G.N.R.R.
SCHILLING PUMP
HARLEM CEMETERY PUMP
McCANN PUMP & DITCH
HARLEM
END OF ZURICH CANAL
HARLEM CANAL
SEWAGE LAGOON
ALCORN DITCHES
Milk River
VIOLET PUMP & DITCHES
ANDERSON PUMP & DITCHES
FORT BELKNAP RESERVATION BOUNDARY
FORT BELKNAP INDIAN RESERVATION AGENCY HEADQUARTERS
T. 32 N-R. 22 E.
T. 31 N-R. 22 E.
LATERAL 3T
LATERAL 12A
LATERAL IIA6
FORT BELKNAP MAIN CANAL
LATERAL IIA
HARLEM CANAL LATERALS
FORT BELKNAP RESERVATION BOUNDARY
LEGEND
Fort Belknap Irrigation Project Milk River Unit
Harlem Irrigation District
Zurich Irrigation District
Private Irrigation
Wayne Creek
1 POWELL PUMP & DITCH
2 BUCKLEY PUMP & DITCH
3 JOHNSON PUMP & DITCH
4 HARLEM DISTRICT PUMP #2
5 FORT BELKNAP IRR. PROJECT DAM & CANAL
6 LATERAL 1T
7 LATERAL 2T
8 UNIT 2
9 GILL PUMP & DITCH
10 UNIT 3
11 UNIT 4
12 LATERAL IIA
13 PORTABLE PUMPS
14 LATERAL IIA5
Milk River
Twp. 32 North
Rge. 23 East


EIGHTH STANDARD PARALLEL NORTH
Savoy Creek
Wayne Creek
Wayne
Badland Coulee Creek
TRACE OF OLD DITCH
EAST
MERIDIAN
GUIDE
SIXTH
G.N.R.R.
Oleson Coulee
PUMP SITE (NOT IN USE)
EPLER PUMP SITE & DITCH (NOT IN USE)
WAYNE CREEK DITCH
GAMBON DITCH
SUREMAN DITCH
HARLEM CANAL
HARLEM CANAL LATERALS
SIEMAN PORTABLE PUMPS
SIEMAN DITCH
SIEMAN PORTABLE PUMPS
OLD DITCH (NOT IN USE)
T. 32 N-R. 23 E
T. 31 N-R. 23 E
EPLER PUMP & DITCH
KUBITZA DITCH
CALVERT DITCH
Wayne Creek
Milk River
Milk River
G.N.R.R.
Savoy Creek
FORT BELKNAP RESERVATION BOUNDARY
LEGEND
Harlem Irrigation District
Private Irrigation
Twp. 32 North
Rge. 24 & 25 East


LEGEND
Private Irrigation
Red Rock Coulee
Red Rock Coulee
OLD DITCH (NOT IN USE)
Poulson Reservoir
Red Rock Coulee
Wrights Coulee
Wrights Coulee
HILL
COUNTY
Bottle Coulee
Milk River
G.N.R.R.
NOT IN USE
River
Daveys Coulee
Milk
Milk River
BRADY PUMP & DITCHES
G.N.R.R.
T. 33 N - R. 16 E
T. 32 N - R. 16 E
Twp. 33 North
Rge. 17 East



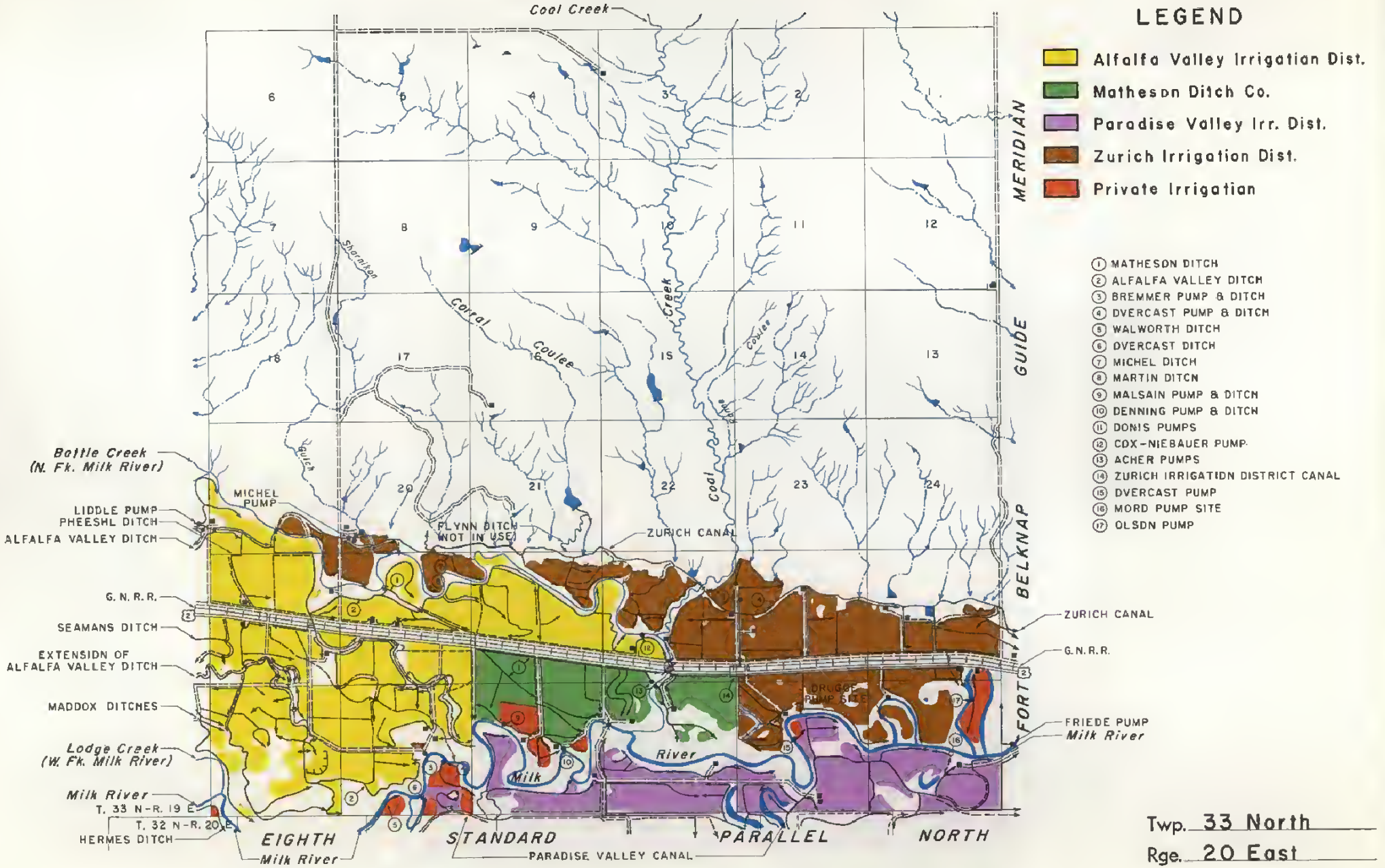
LEGEND

- Fort Belknap Irrigation District
- Private Irrigation

1. PRIDGEON PUMPS & DITCHES
2. NEIBAUER DITCH
3. KESSEL DITCHES
4. JENKINS DITCHES
5. MILLER DITCHES
6. ALFALFA VALLEY - FT. BELKNAP - ZURICH - CANAL HEADGATE
7. KLIENJAW PUMPS & DITCHES
8. THOMPSON PUMPS & DITCHES
9. NEIBAUER PUMPS & DITCH
10. KLIENJAW PUMPS & DITCHES
11. LUCKETT DITCH
12. ARTS DITCH
13. WAISATH DITCH
14. SEE DITCH
15. WAGNER DITCH
16. MATSUOKA DITCHES
17. WAGNER DITCH
18. BOSWORTH DITCHES
19. NASHLUND DITCHES
20. MARKS DITCH
21. KAUFMAN DITCH
22. NASH DITCHES
23. THOMPSON DITCH
24. ARTS PUMPS & DITCHES

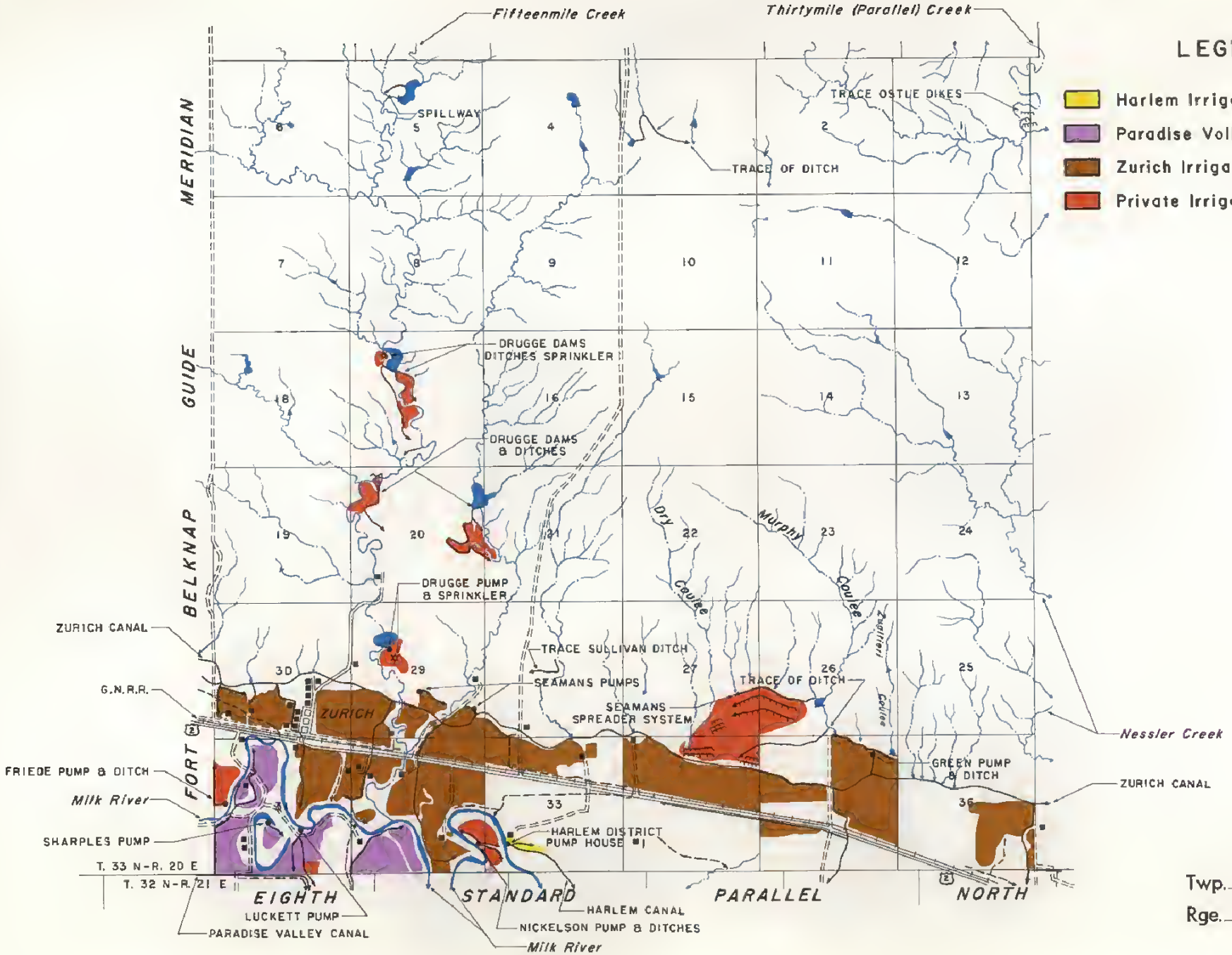
FORT BELKNAP CANAL
MILLER DITCH
Red Rock Coulee
NASLAND DITCH
SEAMAN DITCHES
NASH DITCH
COFFEY - NASH DITCH
FORT BELKNAP DISTRICT DITCH
G.N.R.R.
COFFEY DITCHES
Milk River
HAUGEN PUMP & DITCH

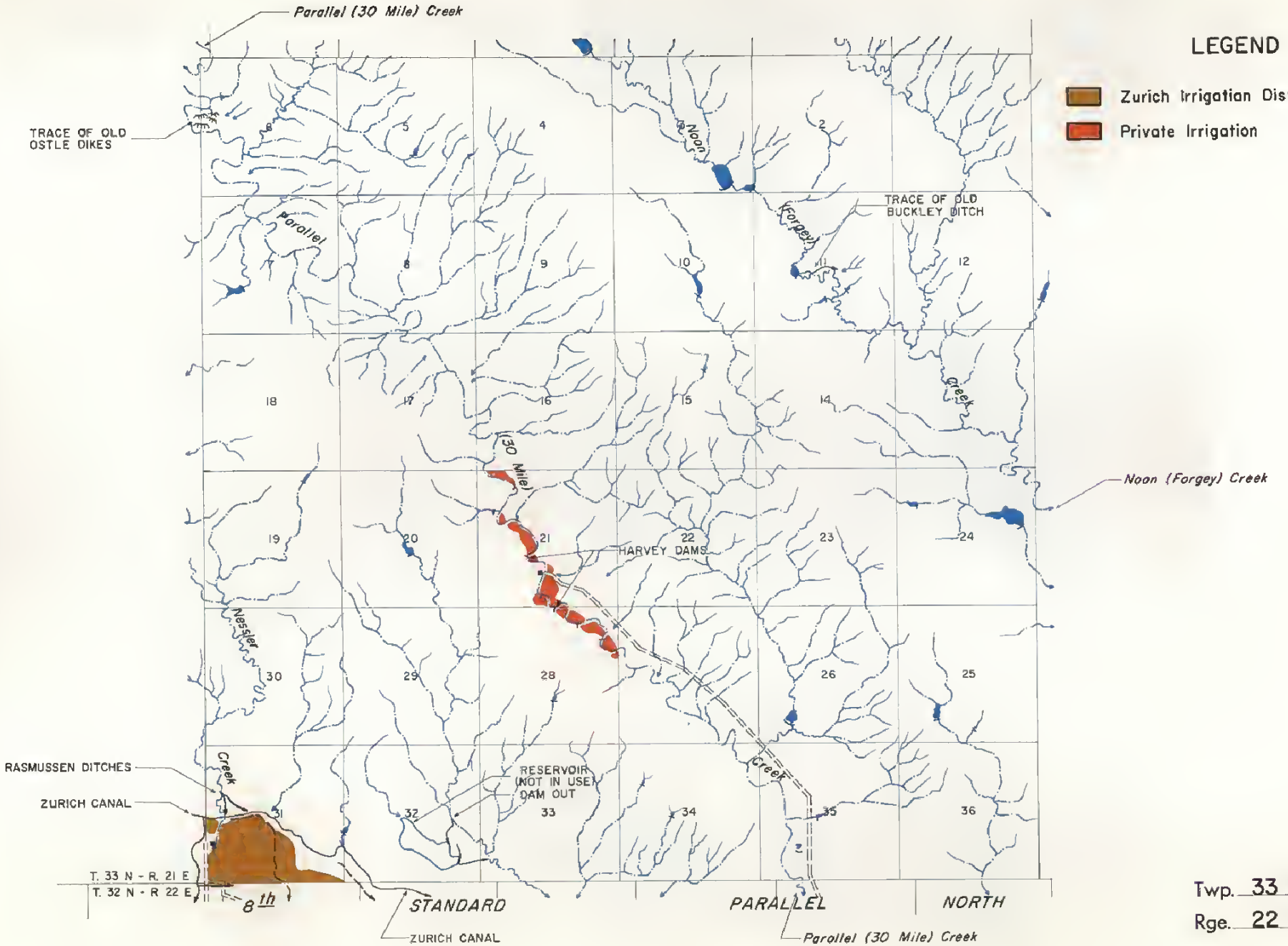
Twp. 33 North
Rge. 18 East

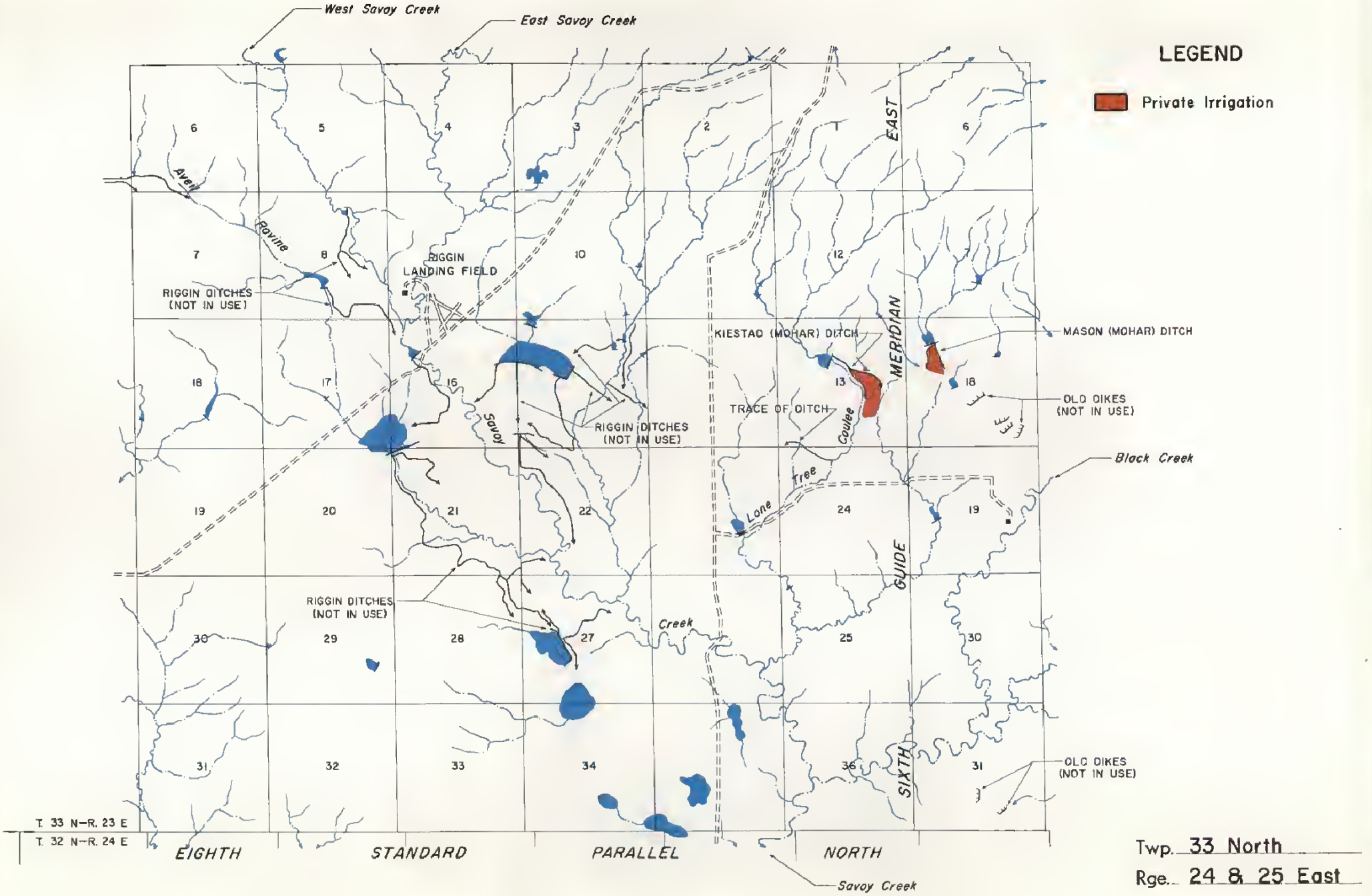


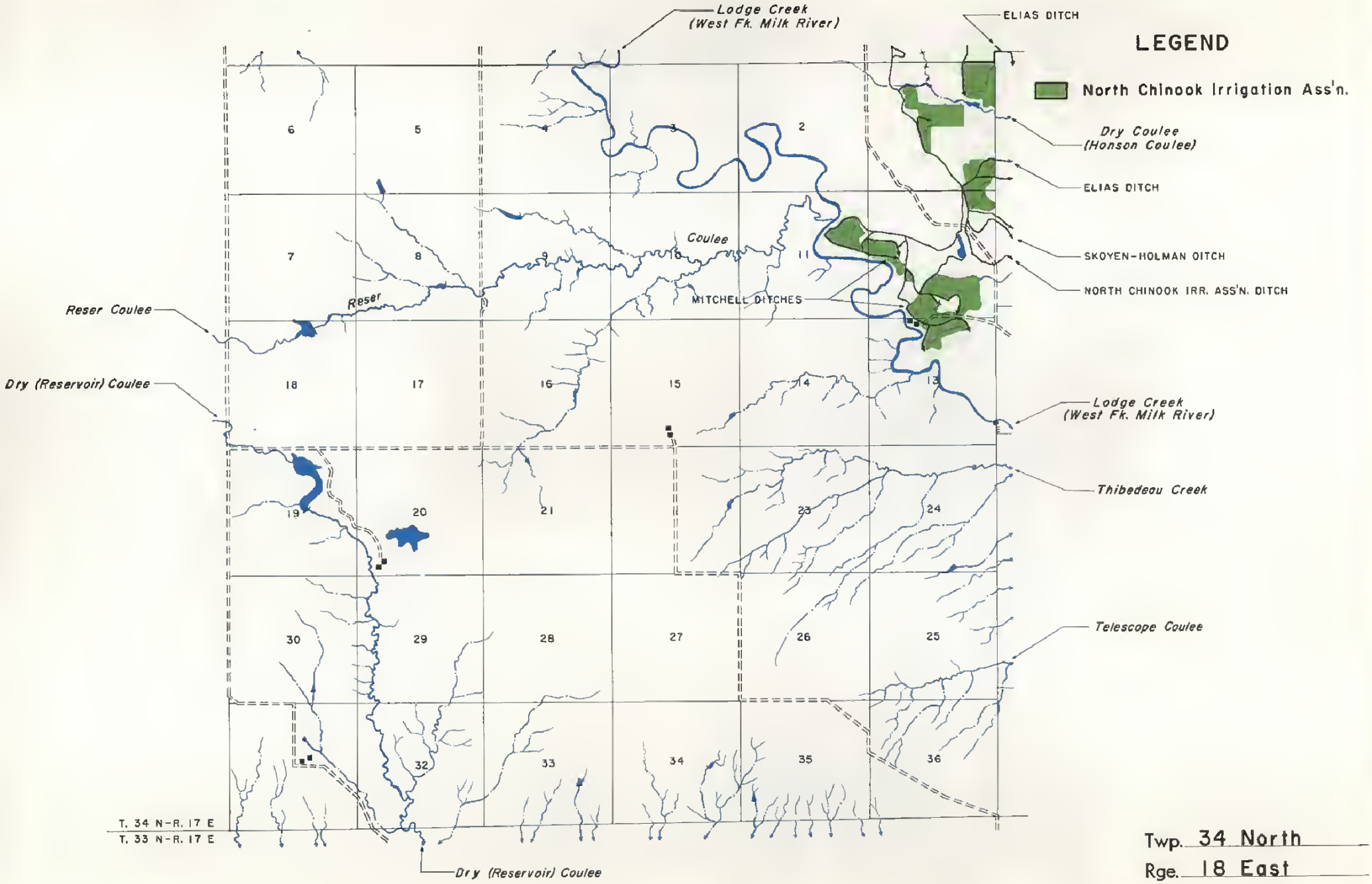
Twp. 33 North

Rge. 20 East

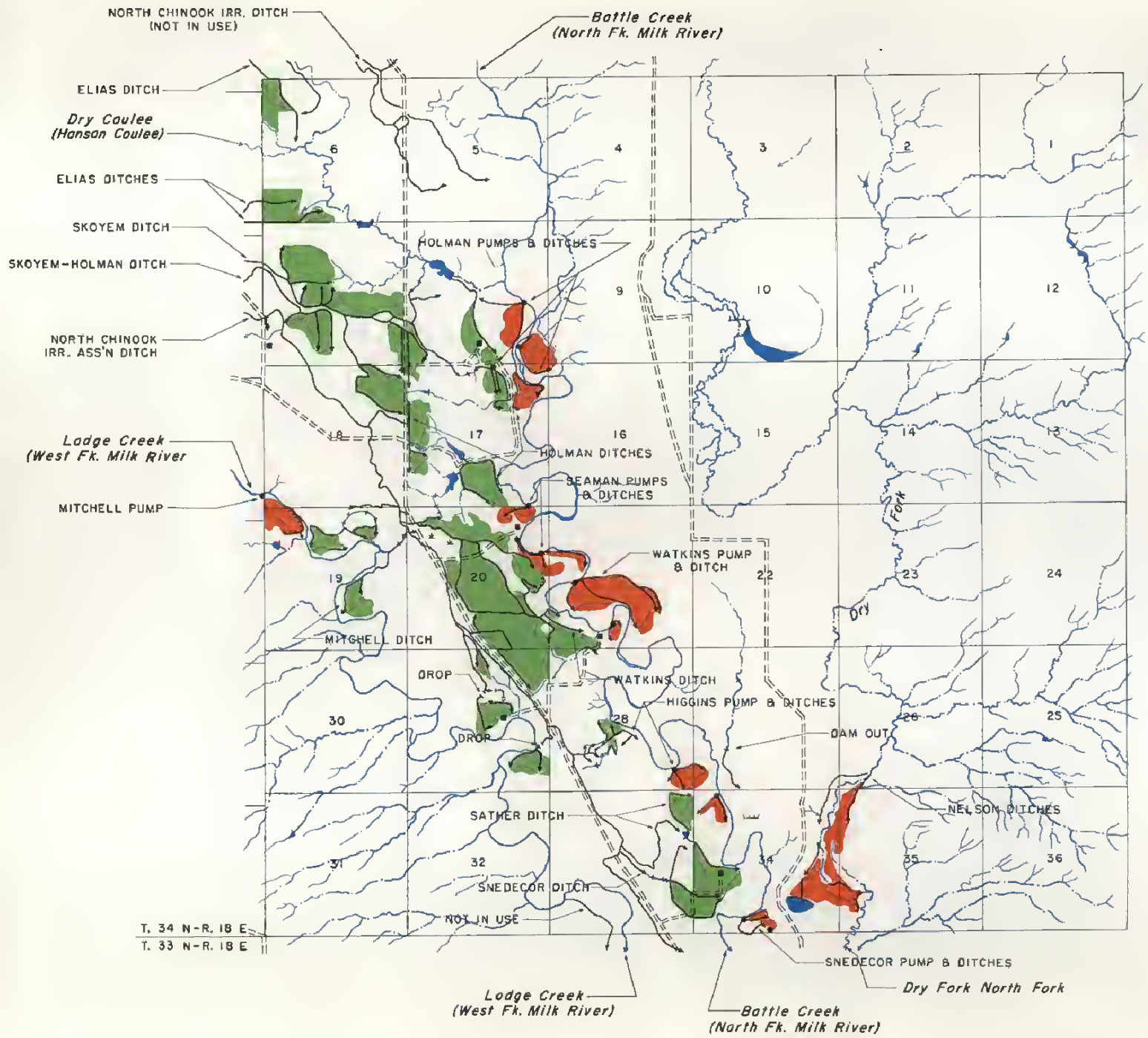

Fifteenmile Creek
Thirtymile (Parallel) Creek
SPILLWAY
TRACE OSTLE DIKES
TRACE OF DITCH
DRUGGE DAMS DITCHES SPRINKLER
DRUGGE DAMS & DITCHES
DRUGGE PUMP & SPRINKLER
ZURICH CANAL
TRACE SULLIVAN DITCH
SEAMANS PUMPS
SEAMANS SPREADER SYSTEM
TRACE OF DITCH
G.N.R.R.
ZURICH
Nessler Creek
FRIEDE PUMP & DITCH
Milk River
SHARPLES PUMP
GREEN PUMP & DITCH
ZURICH CANAL
HARLEM DISTRICT PUMP HOUSE #1
T. 33 N-R. 20 E
T. 32 N-R. 21 E
LUCKETT PUMP
PARADISE VALLEY CANAL
HARLEM CANAL
NICKELSON PUMP & DITCHES
Milk River
MERIDIAN
GUIDE
BELKNAP
FORT
EIGHTH
STANDARD
PARALLEL
NORTH
Dry Coulee
Murphy Coulee
Zaalheri Coulee
LEGEND
Harlem Irrigation District
Paradise Volley Irrigation Dist.
Zurich Irrigation District
Private Irrigation
Twp. 33 North
Rge. 21 East


Parallel (30 Mile) Creek
TRACE OF OLD OSTLE DIKES
Noon (Forgey) Creek
TRACE OF OLD BUCKLEY DITCH
Parallel (30 Mile) Creek
HARVEY DAMS
Nessler Creek
RASMUSSEN DITCHES
ZURICH CANAL
RESERVOIR (NOT IN USE) DAM OUT
T. 33 N - R. 21 E
T. 32 N - R 22 E
8th STANDARD PARALLEL NORTH
ZURICH CANAL
Parallel (30 Mile) Creek
LEGEND
Zurich Irrigation District
Private Irrigation
Twp. 33 North
Rge. 22 East


West Savoy Creek
East Savoy Creek
LEGEND
Private Irrigation
Avell
Ravine
RIGGIN LANDING FIELD
RIGGIN DITCHES (NOT IN USE)
KIESTAD (MOHAR) DITCH
MASON (MOHAR) DITCH
OLD DIKES (NOT IN USE)
TRACE OF DITCH
Coulee
Savoy
RIGGIN DITCHES (NOT IN USE)
Black Creek
Tree
Lone
RIGGIN DITCHES (NOT IN USE)
Creek
Savoy Creek
OLD DIKES (NOT IN USE)
EAST
MERIDIAN
GUIDE
SIXTH
EIGHTH
STANDARD
PARALLEL
NORTH
T. 33 N–R. 23 E
T. 32 N–R. 24 E
Twp. 33 North
Rge. 24 & 25 East



Twp. 34 North
Rge. 18 East

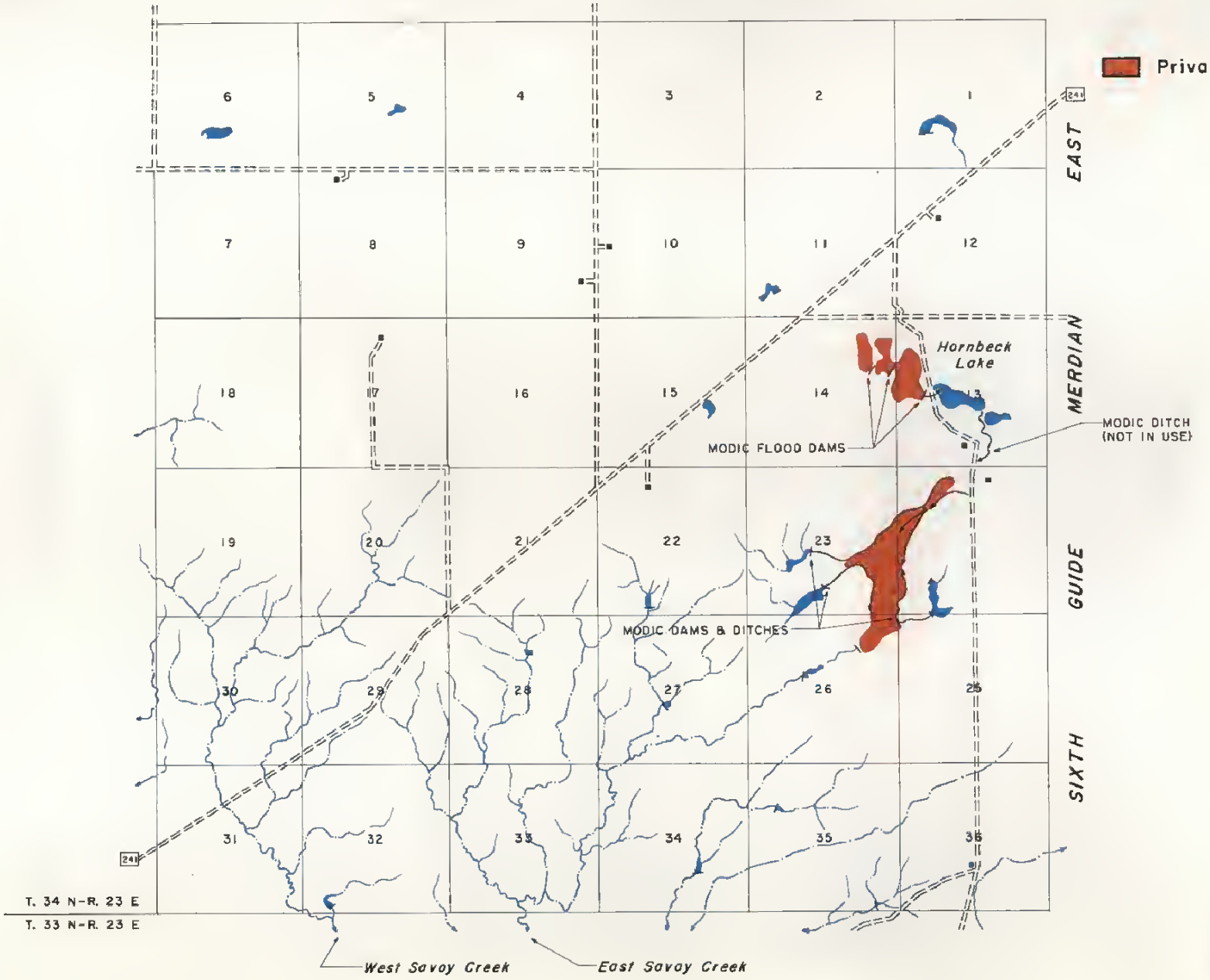


LEGEND

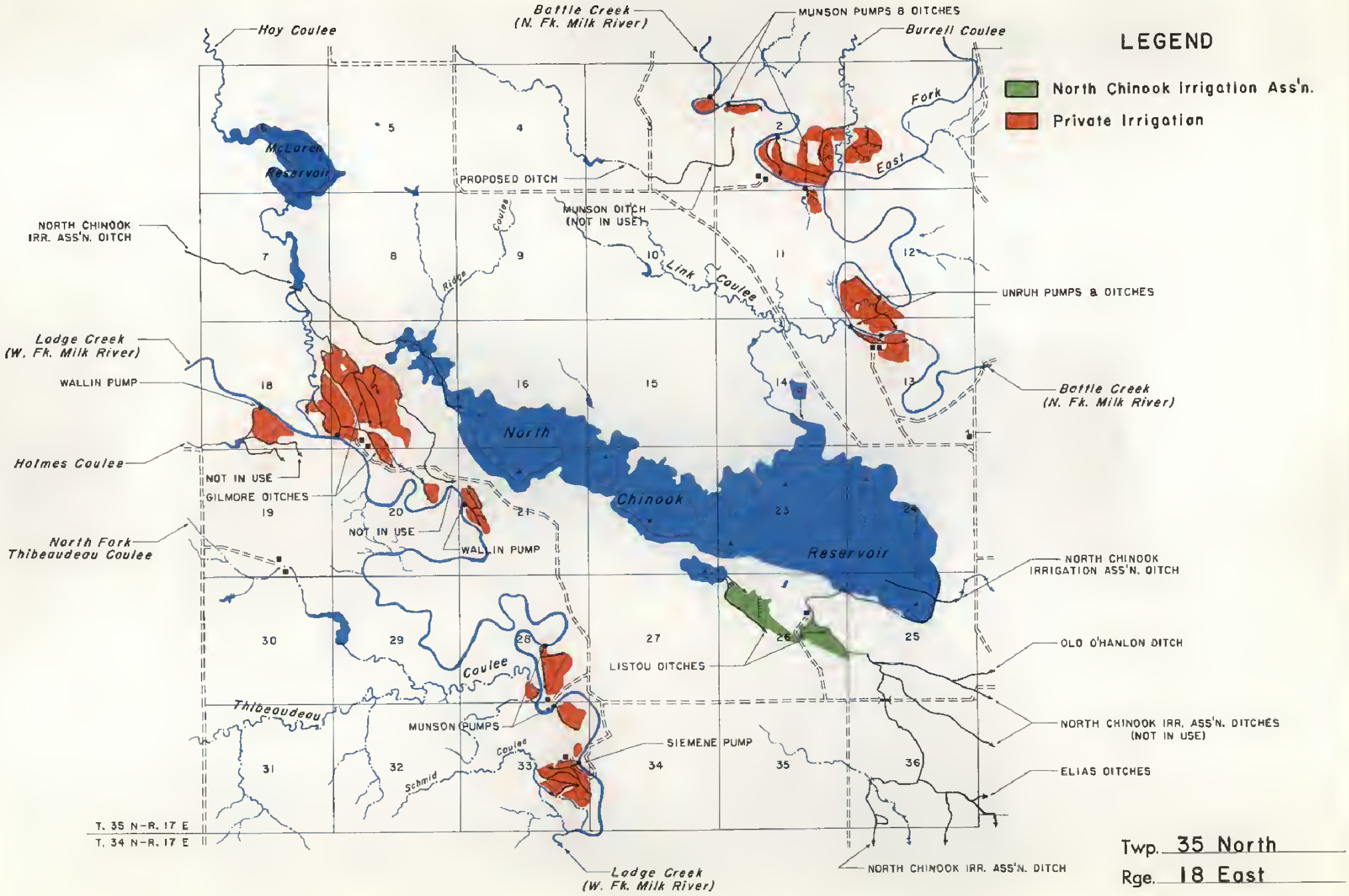
- North Chinook Irrigation Ass'n.
- Private Irrigation

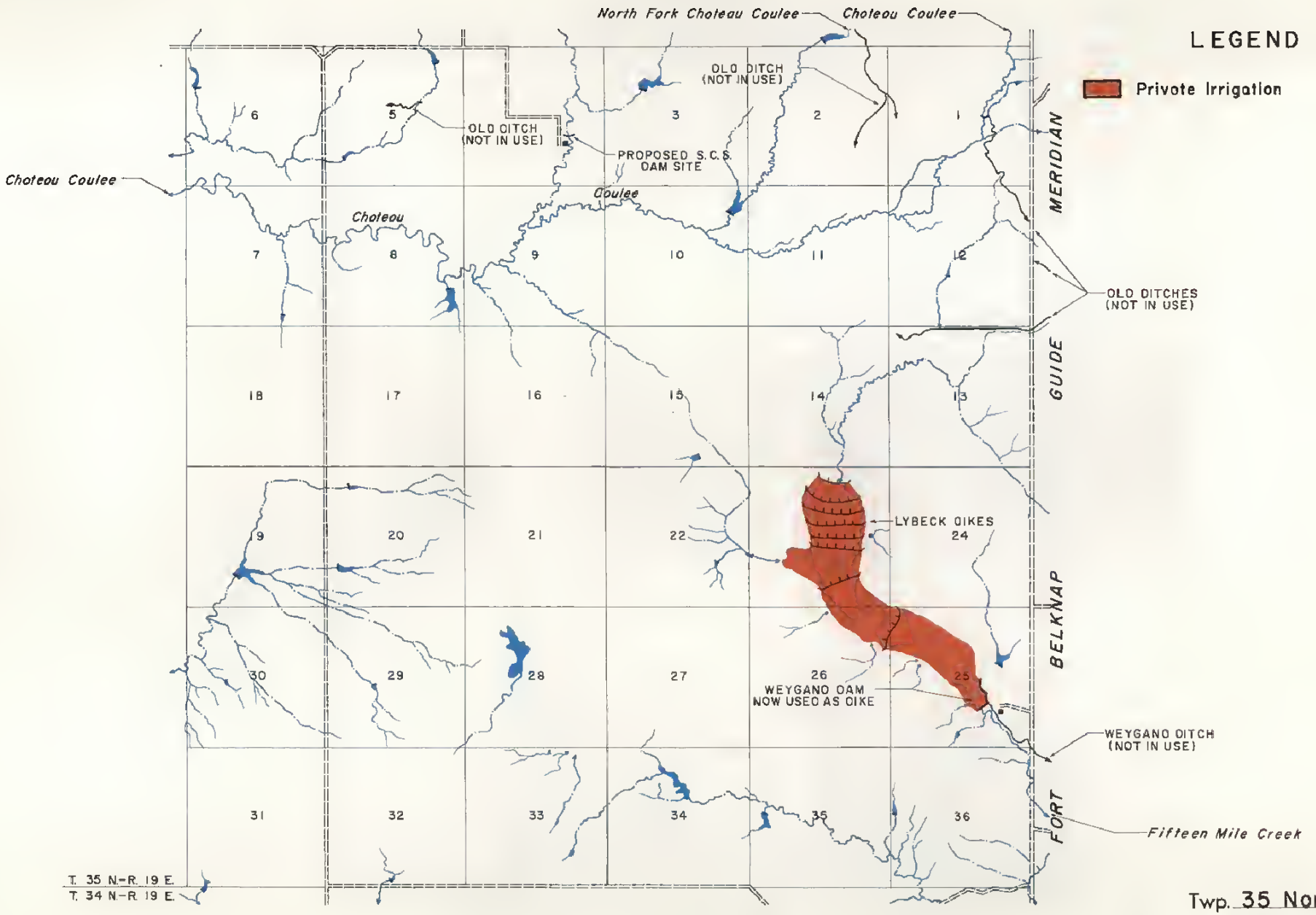
Twp. 34 North

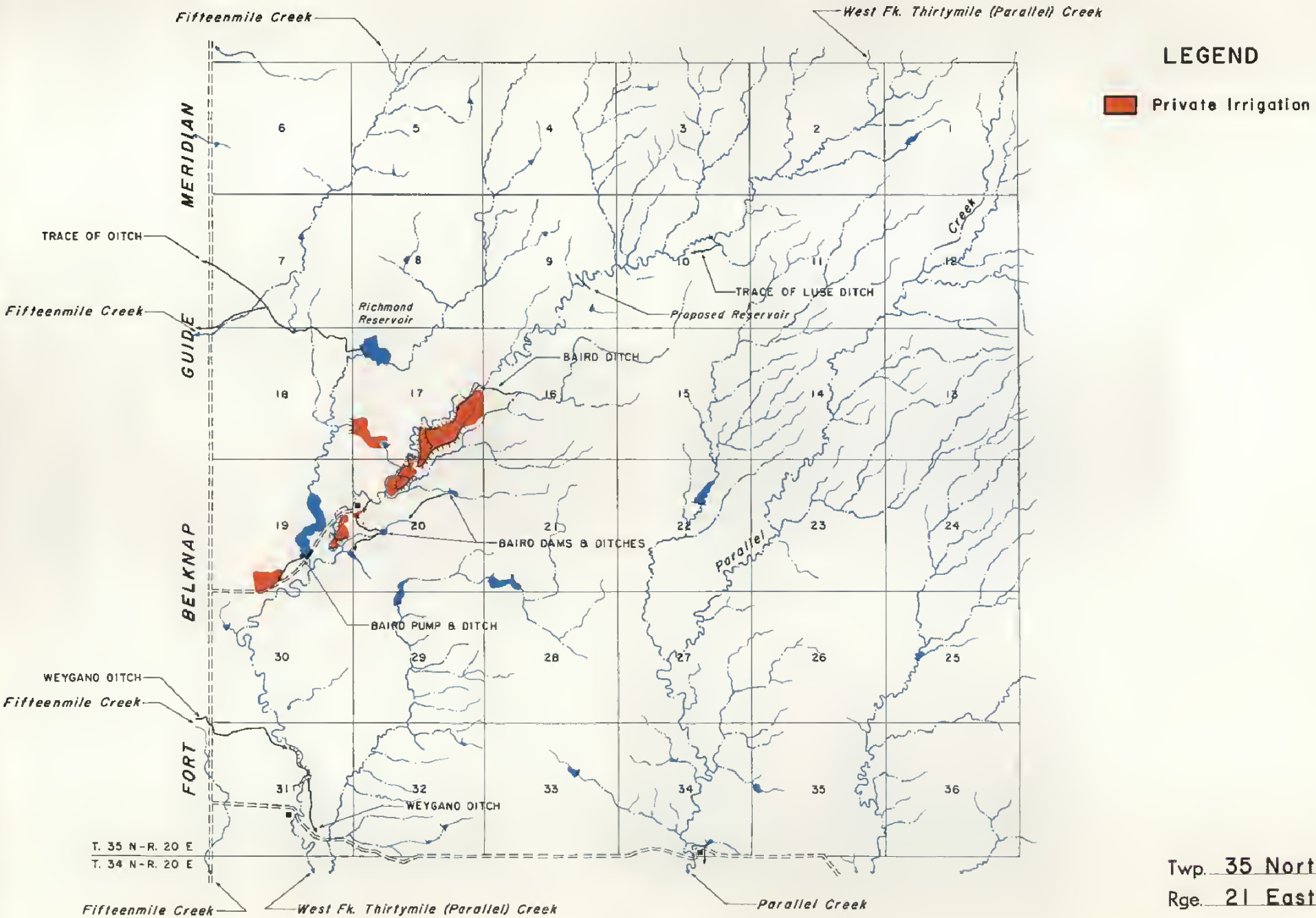
Rge. 19 East



Twp. 34 North
Rge. 24 East


Hoy Coulee
Battle Creek (N. Fk. Milk River)
MUNSON PUMPS & DITCHES
Burrell Coulee
LEGEND
North Chinook Irrigation Ass'n.
Private Irrigation
Fork
East
McLaren Reservoir
PROPOSED DITCH
MUNSON DITCH (NOT IN USE)
NORTH CHINOOK IRR. ASS'N. DITCH
Coulee
Ridge
Link Coulee
UNRUH PUMPS & DITCHES
Lodge Creek (W. Fk. Milk River)
WALLIN PUMP
Battle Creek (N. Fk. Milk River)
North
Holmes Coulee
NOT IN USE
GILMORE DITCHES
Chinook
NOT IN USE
WALLIN PUMP
Reservoir
North Fork Thibeaudeau Coulee
NORTH CHINOOK IRRIGATION ASS'N. DITCH
OLD O'HANLON DITCH
Coulee
LISTOU DITCHES
Thibeaudeau
MUNSON PUMPS
SIEMENE PUMP
Coulee
NORTH CHINOOK IRR. ASS'N. DITCHES (NOT IN USE)
Schmid
ELIAS DITCHES
T. 35 N-R. 17 E
T. 34 N-R. 17 E
Lodge Creek (W. Fk. Milk River)
NORTH CHINOOK IRR. ASS'N. DITCH
Twp. 35 North
Rge. 18 East


North Fork Choteau Coulee
Choteau Coulee
OLD DITCH (NOT IN USE)
OLD DITCH (NOT IN USE)
PROPOSED S.C.S. DAM SITE
Choteau Coulee
Choteau
Coulee
MERIDIAN
OLD DITCHES (NOT IN USE)
GUIDE
LYBECK DIKES
BELKNAP
WEYGANO DAM NOW USED AS DIKE
WEYGANO DITCH (NOT IN USE)
FORT
Fifteen Mile Creek
T. 35 N.-R. 19 E.
T. 34 N.-R. 19 E.
LEGEND
Private Irrigation
Twp. 35 North
Rge. 20 East

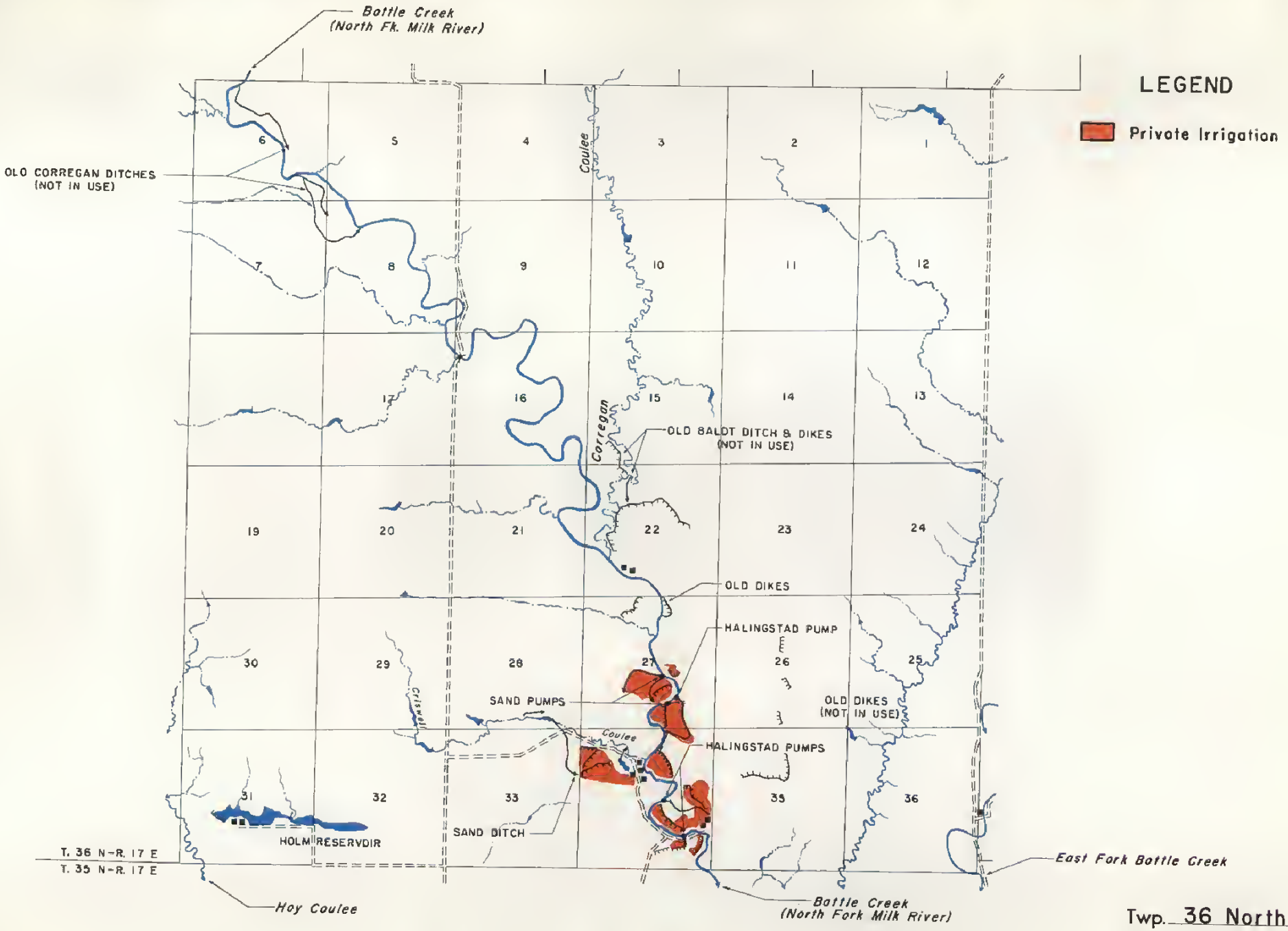


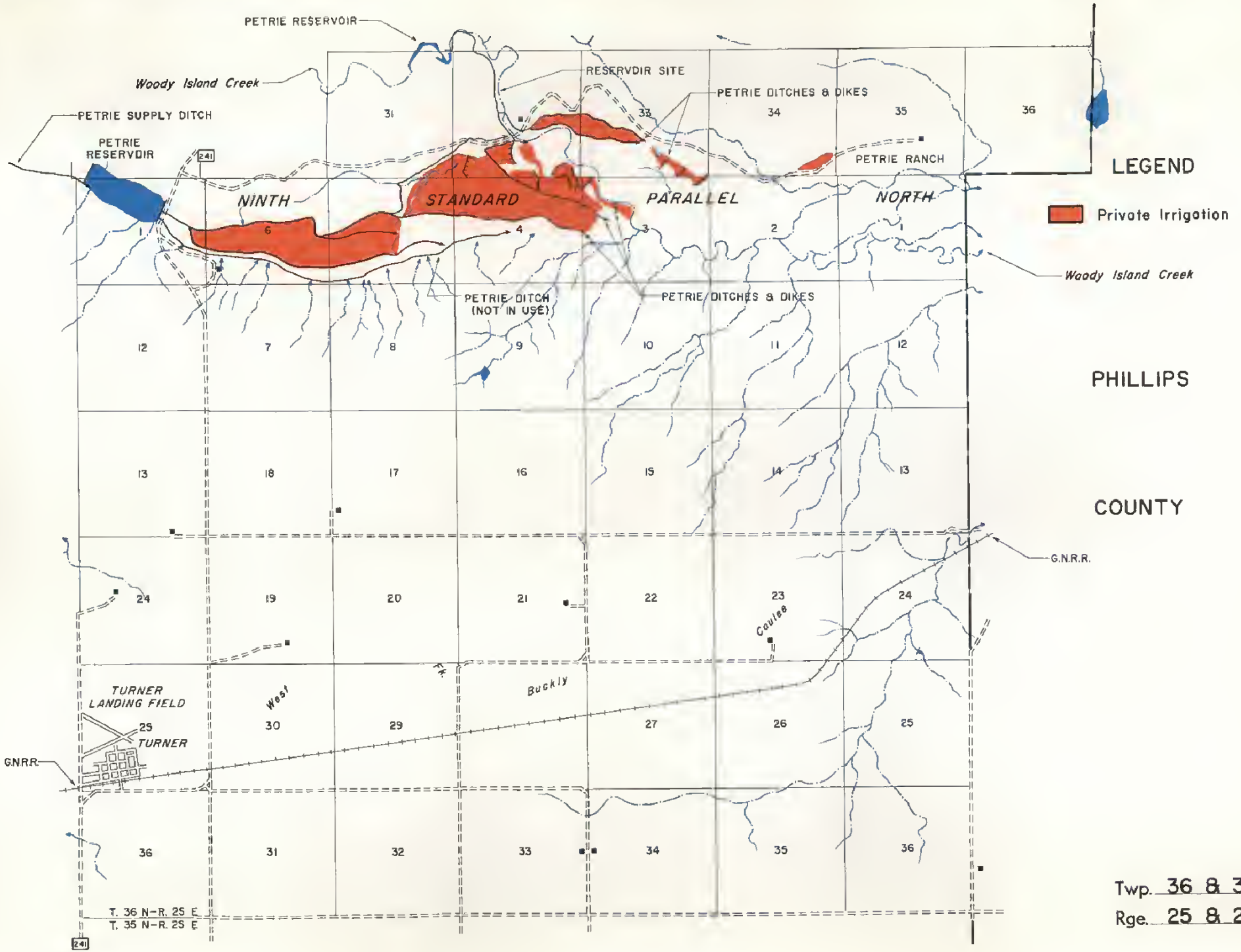
LEGEND

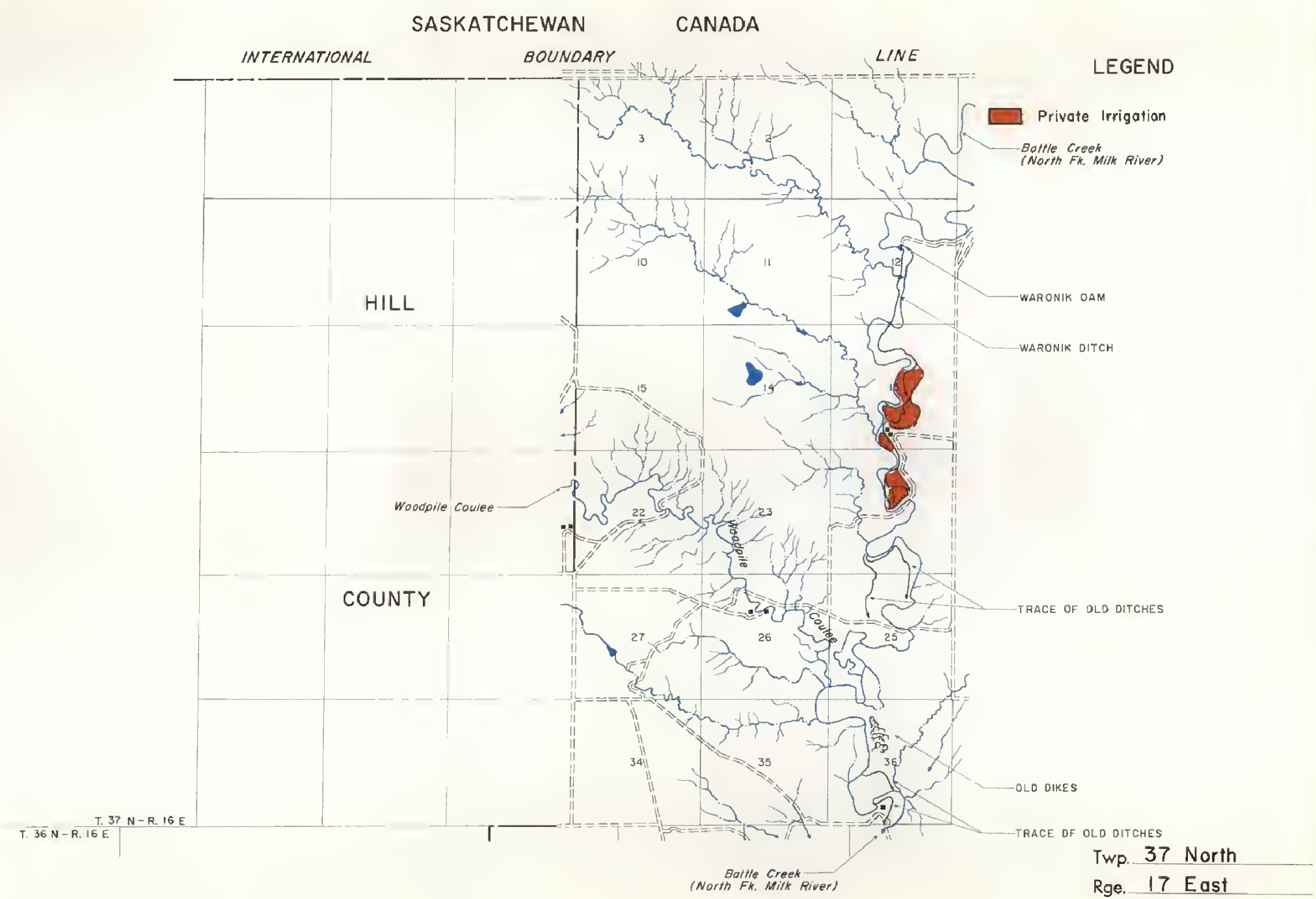
Private Irrigation

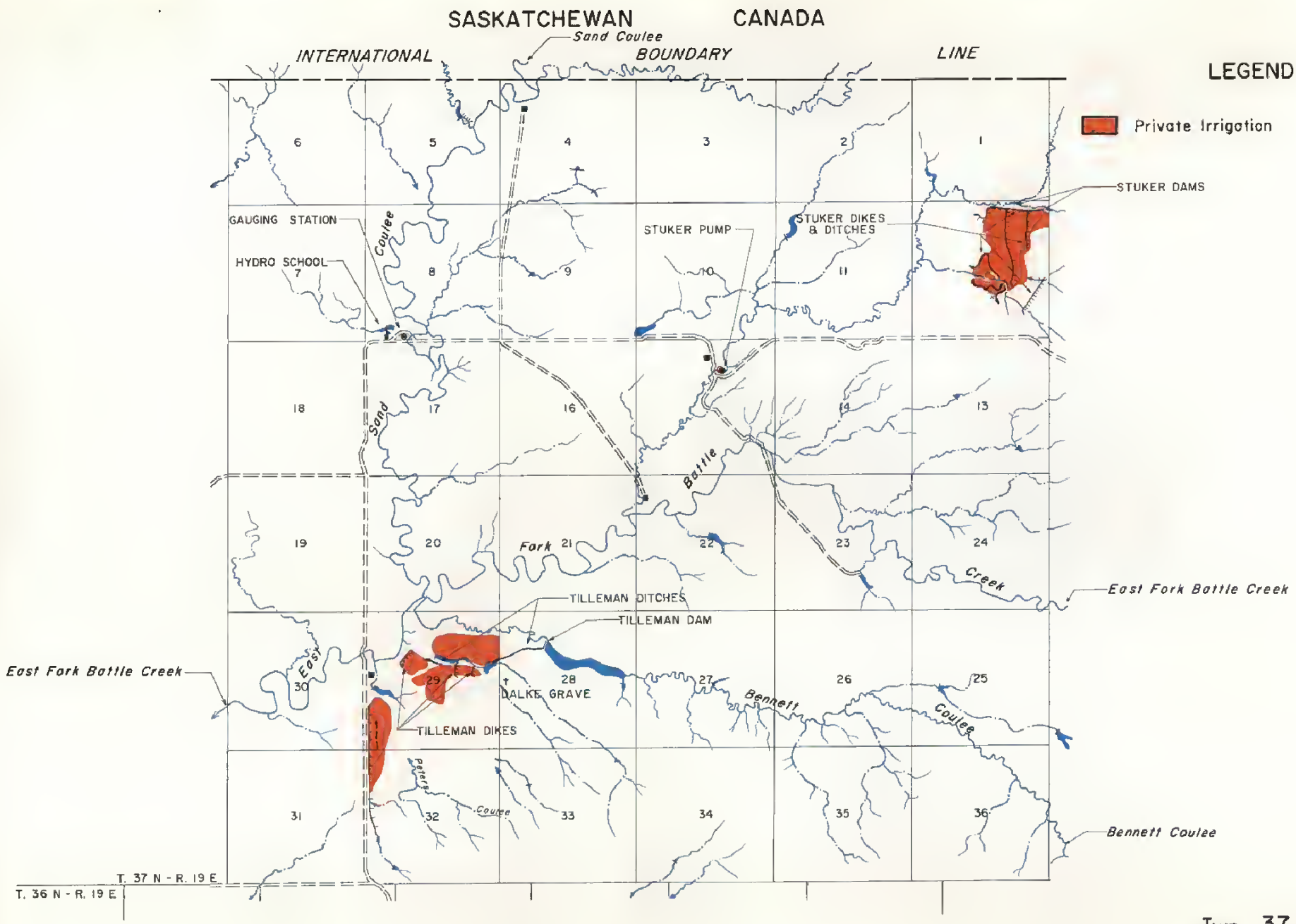
Twp. 35 North

Rge. 21 East


Bottle Creek
(North Fk. Milk River)
OLD CORREGAN DITCHES
(NOT IN USE)
Coulee
Corregan
OLD SALOT DITCH & DIKES
(NOT IN USE)
OLD DIKES
HALINGSTAD PUMP
SAND PUMPS
OLD DIKES
(NOT IN USE)
Coulee
HALINGSTAD PUMPS
Cristwell
HOLM RESERVOIR
SAND DITCH
T. 36 N-R. 17 E
T. 35 N-R. 17 E
Hoy Coulee
East Fork Bottle Creek
Bottle Creek
(North Fork Milk River)
LEGEND
Private Irrigation
Twp. 36 North
Rge. 18 East

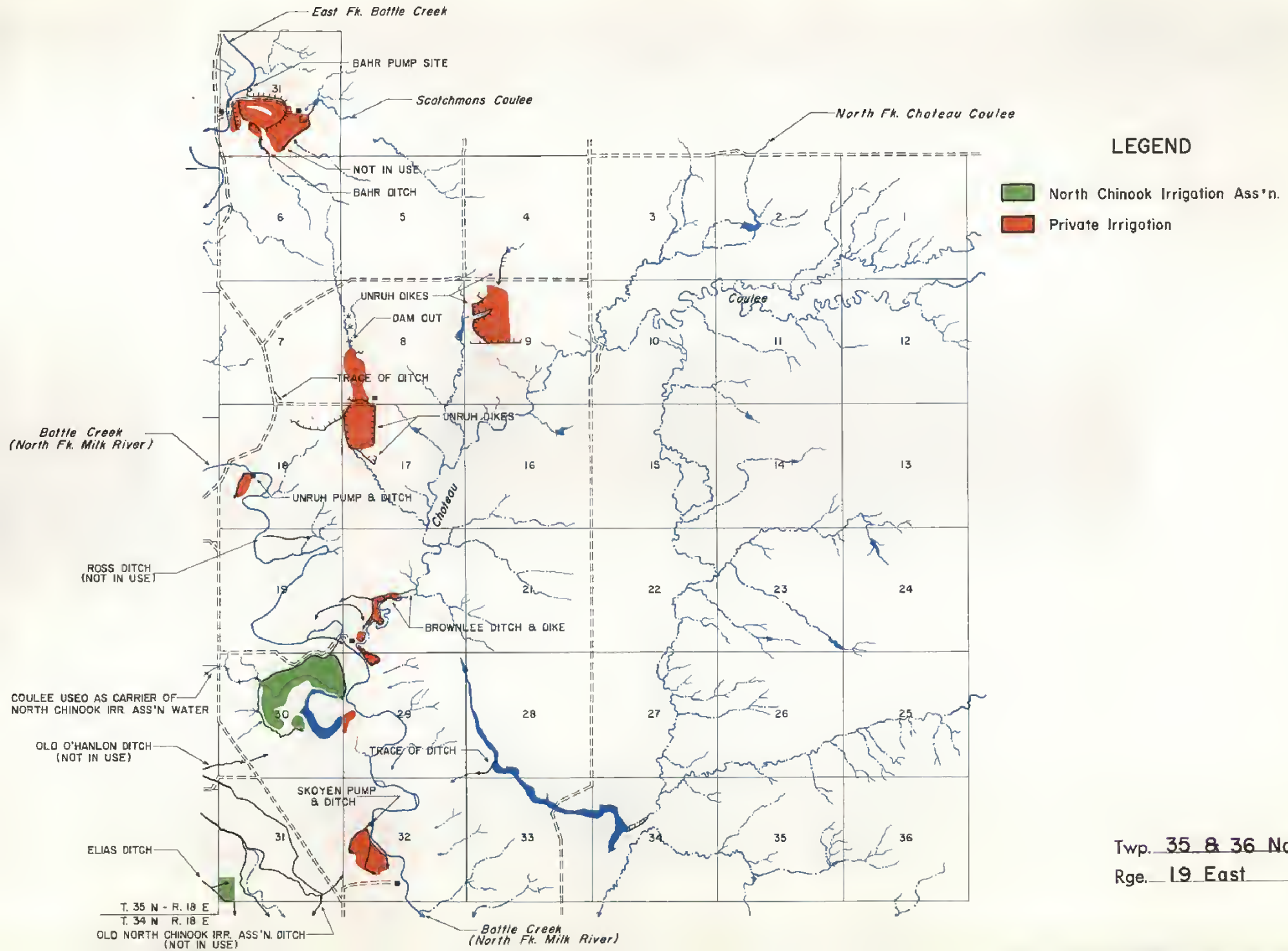

PETRIE RESERVOIR
Woody Island Creek
RESERVOIR SITE
PETRIE DITCHES & DIKES
PETRIE SUPPLY DITCH
PETRIE RESERVOIR
PETRIE RANCH
NINTH
STANDARD
PARALLEL
NORTH
PETRIE DITCH (NOT IN USE)
PETRIE DITCHES & DIKES
Woody Island Creek
G.N.R.R.
Coulee
TURNER LANDING FIELD
TURNER
West
Buckly
GNRR
T. 36 N-R. 25 E.
T. 35 N-R. 25 E.
LEGEND
Private Irrigation
PHILLIPS
COUNTY
Twp. 36 & 37 North
Rge. 25 & 26 East


SASKATCHEWAN CANADA
INTERNATIONAL BOUNDARY LINE
LEGEND
Private Irrigation
Battle Creek (North Fk. Milk River)
WARONIK DAM
WARONIK DITCH
TRACE OF OLD DITCHES
OLD DIKES
TRACE OF OLD DITCHES
HILL
COUNTY
Woodpile Coulee
Woodpile Coulee
Battle Creek (North Fk. Milk River)
3
2
10
11
12
15
14
22
23
27
26
25
34
35
36
T. 37 N - R. 16 E
T. 36 N - R. 16 E
Twp. 37 North
Rge. 17 East



Twp. 37 North

Rge. 20 East


East Fk. Bottle Creek
BAHR PUMP SITE
Scotchmans Coulee
North Fk. Choteau Coulee
NOT IN USE
BAHR DITCH
UNRUH DIKES
DAM OUT
Coulee
TRACE OF DITCH
UNRUH DIKES
Bottle Creek
(North Fk. Milk River)
UNRUH PUMP & DITCH
Choteau
ROSS DITCH
(NOT IN USE)
BROWNLEE DITCH & DIKE
COULEE USED AS CARRIER OF
NORTH CHINOOK IRR. ASS'N WATER
OLD O'HANLON DITCH
(NOT IN USE)
TRACE OF DITCH
SKOYEN PUMP
& DITCH
ELIAS DITCH
T. 35 N - R. 18 E
T. 34 N R. 18 E
OLD NORTH CHINOOK IRR. ASS'N. DITCH
(NOT IN USE)
Bottle Creek
(North Fk. Milk River)
LEGEND
North Chinook Irrigation Ass'n.
Private Irrigation
Twp. 35 & 36 North
Rge. 19 East